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—FEATURES—

A Papermaker's Bookshelf.....Clarence J. West 1085

Bibliography of Nomographs of Pulp and Paper Application.....Roy Myllynen and D. S. Davis 1089

Hazards at Wet Felt Presses.....George J. Adams 1090

Recent Engineering Developments Increase Production.....W. R. Harris 1093

Automatic Weighing of Digester Chip Loadings..N. V. Edmonson 1097

Annual Meeting of Canadian Technical Section..... 1104

Convention Papers . . . Abridged..... 1116

—NEWS—

All-Out to Win..... 1068

Trade Winds 1069

Allied 1102

Associations 1104

Safety 1108

Names in the News..... 1110

Personals 1110

Necrology 1114

—DEPARTMENTS—

Theme Page 1068

Editorials 1081

Current Thought 1082

Paper Sketches 1100

Coming Events 1108

Safety Contest Scores..... 1108

New Equipment & Supplies.. 1144

Technical Developments ... 1150

Papermaking Patents 1152

Catalogues, Books & Reports 1154

Current Market Quotations.. 1158

Index to Advertisers..... 1161

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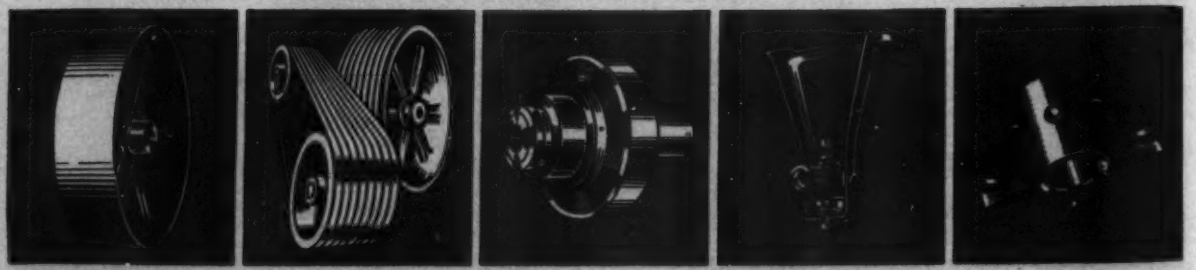

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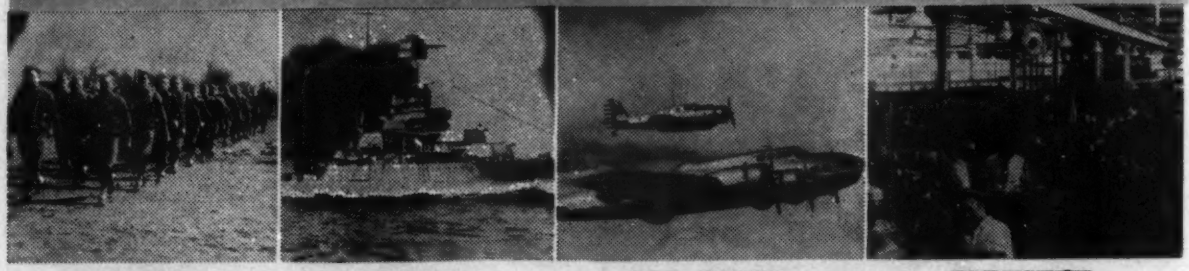

ARMY ● NAVY ● AIR CORPS ● INDUSTRY ▬

The ARMY, the NAVY, the AIR CORPS, and INDUSTRY have gone to war. And because the most vicious and cruel aggressors of all time have invaded peaceful, prosperous, Christian nations, this conflict is unparalleled. Those "four horsemen" that spread death and destruction must be defeated and conquered. The U.S.A. has never lost a war, and because it has fought only for liberty from oppression and its people have asked for nothing except freedom, it has been built on the most enduring foundation of all time—an impregnable fortress of right, and "right makes might." Back of those who fight is another army, great and powerful. Indeed INDUSTRY truly is the army of production. With the country's vast industrial forces geared to an all-time high, planes, ships, guns, and supplies will go to the front with amazing speed. This nation's military and industrial armies are "all-out to win," therefore, the conquest over freedom's foes will be victorious.

TRADE WINDS

. . Washington News . .

WPB Issues Eight New Directives

▶▶▶ THE OFFICE OF Norbert A. McKenna, chief of the Pulp & Paper Branch of the War Production Board, has just released to paper manufacturers complete text of the WPB's program for the simplification, standardization and reduction in basis weight of various kinds of papers. The eight directives issued cover the following grades of papers:

1) Book Papers for Commercial Advertising and Printing. English (Machine) Finish Book Papers; Supercalendered Book Papers; Eggshell (Antique) Book Papers; Process (Machine) Coated Book Papers; Plain Offset Book Papers; Offset Coated Two Sides Papers; Glossy Coated Two Sides Book Papers; Dull Coated Book Papers; Plain Coated Cover Papers; Coated One Side Book Papers.

2) Fine Papers for the Commercial Advertising and Printing Field. Rag Content Bond Papers (excluding extra 100 per cent rag content bond); Rag Content Ledger Papers (excluding extra 100 per cent rag content ledger); Rag Content Loose Leaf and/or Machine Posting Ledger Papers (excluding extra 100 per cent rag content grades); Rag Onion Skin and Manifold Papers; Rag and Wood Pulp Cover Papers; Specialty Cover Paper (coated, waterproofed, embossed, etc.); Rag Content Index Papers (excluding 100 per cent extra rag content index paper); Rag Content Writing and Linen Papers; Rag Content Wedding Paper; Blue Print and Direct Line Papers; Sulphite Bond Papers; Sulphite Ledger Papers; Wood Pulp Mimeograph Papers; Sulphite Writing Papers; Wood Pulp Onion Skin and Manifold Papers; Wood Pulp Index Bristol Papers; Wood Pulp Vellum or Wedding Papers; Converting Grades of Wood Pulp Papeterie; Register Bond Papers.

3) Kraft Wrapping Paper; (4) Wrapping Tissue; (5) Vegetable Parchment; (6) Butchers' Papers; (7) Grocery Bags & Sacks; (8) Gummed Sealing Tape. The specifications for the various groups are given in complete detail. Numbered respectively as shown above, these directives cover the following points: (1) standardization, simplification, and reduction in basis weights; (2) standardization, basis weight reduction, color and furnish restriction; (3) basis weight reduction, standardized roll and sheet sizes; (4) basis weight reduction, sheet size and color standardization; (5) basis weight reduction and sheet size standardization; (6) basis weight reduction, roll width specifications; (7) standardization of size and basis weight; (8) basis weight reduction and width regulation.

These directives close with the request that manufacturers inform the Pulp and Paper Branch of the War Production Board, 3rd Floor, 3rd Wing, Temporary Building "E," 6th & Adams Drive, S.W., Washington, D. C., as promptly as possible whether or not these plans will be followed. If any manufacturer differs with any of the points set forth in this program, he is asked to inform this Branch in what respects he believes this program is unfair and the reasons why he does not wish to comply with the plan.

▶▶▶ ALL GOVERNMENT PURCHASES of sulphite pulp for nitrating and other special purposes during January have been allocated to Rayonier, Inc., the total being 4,200 tons. Originally this amount was to be secured from Rayonier, Eastern Corporation and Brown Company, under the terms of the pulp pool by which other pulp producers would supply sufficient pulp to customers of these three companies to fill the contracts originally placed with them. By a change of allocation, however, the entire January allocation was placed with a single company. A schedule issued by the War Production Board specifies in detail the amount which every other producer will place at the disposal of the pool to assure pulp consumers of their usual requirements.

▶▶▶ THE ELIMINATION OF the Office of Production Management and the establishment of a new War Production Board will have no direct effect upon the personnel in OPM which has handled paper problems. The new board, with Donald M. Nelson in charge will have the central authority so long called for by those conversant with war production matters, and Mr.

Nelson has already exercised his authority by establishing an entirely new, and more cohesive organization to deal with the problems of war production. Several important divisions have been established. The Paper Industry comes under J. S. Knowlson, director of the Division of Industrial Operations, and his deputy, Philip Reid, will have direct charge of paper and pulp matters. The personnel of the former Pulp and Paper Branch of OPM is transferred complete to Mr. Knowlson's division, with Mr. McKenna remaining in charge under Mr. Reid.

▶▶▶ TRADE AGREEMENTS with practically all Latin American countries have been concluded at Rio de Janeiro. All legislative and administrative barriers including tariffs, customs and other regulations which would impede a hemispheric all-out war production effort will be suspended for the duration of the war. All except Brazil, Chile, Ecuador, and Argentina signed such agreements at once, and they are expected to be added to the list without delay.

▶▶▶ THAT THE USE OF CHLORINE in paper manufacturing will be reduced to an absolute minimum about April 1 is the present forecast. The necessary directives are being drafted, and after that date it is probable that there will be no bleached pulp available for any purpose, with the possible exception of photographic and similar essential papers for national defense.

▶▶▶ JAMES L. COKER, president of Sonoco Products Company, has been made a consultant in the Pulp and Paper Branch of WPB. He is the third generation of his family in paper manufacturing.

▶▶▶ OAKLEY W. DEXTER, purchasing agent for the Crown Zellerbach Paper Company, has been appointed assistant director of purchases, supervising purchasing of safety and technical equipment in the Division of Purchases of the War Production Board.

▶▶▶ THE UNITED STATES Paper Exporters Council, Inc., has been formed to cooperate with the Government in facilitating exports at reasonable prices in such amounts as will be of maximum benefit and service to friendly foreign buyers, and at the same time be fair to domestic, military, and civilian requirements. The Council, including firms which finance their business directly with foreign firms, has the following officers: President — Elwin Walker, Walker Goulard Plehn Company; vice president—Eli de Vries, Parsons & Whittemore; secretary - treasurer—Frank W. Smith, National Paper & Type Company; directors — George Cobean, Bulkley, Dunton & Company; Fred Strype, Fred C. Strype, Inc.; and James F. Capen, A. M. Capen's Sons, Inc. It is planned to maintain close contact with the government agencies to eliminate practices inimical to development of good will of foreign buyers, and to maintain records and details of foreign paper exports. All operations will be in harmony with the wishes of the Office of Price Administration.

▶▶▶ A FEDERAL GRAND JURY at Philadelphia has indicted forty-four corporations, and eighty-nine officers and directors on a charge of engaging in a nation-wide conspiracy to control the production and prices of waxed paper products. According to the indictment, the firms involved control about 90 per cent of the entire United States production of waxed paper in all forms from waxed bread wrappers to candy wrappers and smaller articles.

▶▶▶ THE ANNOUNCED INCREASE IN PRICES for newsprint paper made by several Canadian mills has resulted in a conference at Washington between the OPA officials and leading domestic publishers. The conference was called to ascertain the possible effect of the $3 a ton increase on the publishing industry. The publishers were asked whether present operating revenue would absorb the rise or whether they might find it necessary to reduce the size of their publications, advance rates, or take other action.

▶▶▶ DRASTIC ACTION is threatened against all manufacturers, converters, users and distributors of pulp paper and paper products who permit inventories to go beyond a practical working minimum. The threat, it will be noted, applies not only to distributors of paper, but also to the mills which permit them to buy paper on a scale which would involve the building up of excessive inventories in warehouses.

▶▶▶ ESTIMATES OF 1942 REQUIREMENTS for waste paper for reuse by the paper and board industry are 7,500,000 tons. The 1941 rate was about 6,250,000 tons, but the drive for collection which is now on a national basis is expected to bring collections to about the volume required.

▶▶▶ A PERIOD OF CAPACITY production by the Brown Company, Berlin, New Hampshire, has enabled the company to repay $1,660,095 on the principal of the $4,500,000 loan which the company received from the RFC in 1941, according to an announcement by H. P. Carruth, vice president in charge of operations. This payment will be applied to future sinking fund requirements. Mr. Carruth states that the savings in interest charges will amount to $66,000 per year.

▶▶▶ PURCHASE OF DEFENSE BONDS through a payroll allotment plan has been put into operation by the Thilmany Pulp & Paper Company, Kaukauna, Wisconsin, on a voluntary basis, according to L. C. Smith, personnel director. Under this plan employees will authorize a deduction from their earnings each month in multiples of 50 cents, but not less than $2, the amount otherwise to be determined by the employees.

◆

SECOND REVISION OF WITHAM'S BOOK IS NOW COMPLETED

When he passed away in June, 1937, the late George S. Witham, Sr., had almost finished revising his popular practical book *Modern Pulp and Paper Making*. This work was the first book to deal with pulp and papermaking as it is carried on in America. Previous books were based largely on the English practice, which in many respects is entirely different.

The revision of this book has now been completed with the assistance of George S. Witham, Jr., who follows after his father and is a well-known papermaker.

◆

FINANCIAL

With the end of the year and the first excitement over America's entry into the war past history, the securities markets have worked steadily higher, and paper mill stocks and bonds have shared in the advance.

Celotex Corporation—Net profits for the fiscal year ending October 31 were $1,749,099, as against $747,628 for the previous year.

Certain-Teed Products—Net credit to surplus for the nine months ending September 30 was $1,154,665 as against $451,143 for the same period in 1940.

Champion Paper & Fibre Co.—Net profit for 28 weeks ending November 9 was $1,452,000 as against $1,176,747 for the comparable period in 1940.

Marathon Paper Mills Company—Net income for the fiscal year ending October 31 was $1,205,515 as against $845,563 for the previous year.

Mead Corporation—Net income for the ten four-week periods ending Octo-

PAPER · · · America's 6th Industry

RUSH! TARGET PAPER

(NEWS ITEM: *The War Department has this week included in its announcement of contracts $79,904.00 for target paper.*)

The Paper and Board Mills of the United States will supply 8 million tons of Paper products directly needed for the armed forces during 1942. This is approximately 40 per cent of the tonnage of an industry working at capacity.

Target paper for the practice range . . . condenser paper for electrical equipment . . . specialty papers for insulation . . . casings for shell containers . . . blueprint paper for the Navy and for defense plants . . . paperboard for packing shells, clothing and food—these and many other grades of paper are typical contributions of the Paper Industry to America's war effort.

With the Paper Industry running at capacity to achieve the record-breaking tonnage demanded by the Victory program, any further increase in production means modernization—the improvement of present equipment by installation of the latest developments in high-speed paper machines.

Consider the Puseyjones Flow-Spreader for improving the delivery of stock to the fourdrinier or cylinder wet end. With the Puseyjones Flow-Spreader, the entire flow comes from one pipe and is spread smoothly and evenly across the machine by a simple nozzle construction without use of multiple inlets, baffles and other flow distributing devices. Formation is improved. Production is increased.

Keeping paper production at the point of highest efficiency is not only essential to Victory, but also best for the tremendous competition coming after the present emergency is over.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

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ber 4 was $1,418,004 as against $983,197 for the comparable period in 1940.

Puget Sound Pulp & Timber Company—Timber land purchases involving acquisition of over 100,000 acres of excellent stumpage, at a cost of about $2,500,000 is announced. Part of the cost was met by bank loans, and the balance from company surplus.

Southern Advance Paper Bag Company—Net earnings for eleven months ending November 30 were $589,229, as against $615,029 for the previous year.

West Virginia Pulp & Paper Company—Net earnings for the fiscal year ending October 31 were $4,270,312 as compared with $3,670,621 for the previous year.

New York Stock Exchange—Stocks

	Closing Prices Jan. 21, 1942	Dec. 31, 1941
A. P. W. Paper Co.	1½	1
Celotex	7⅞	7¾
Same Preferred	*69¼–71	72½
Certain-Teed	2¼	1⅜
Same Preferred	27¼	24
Champion P. & F. Co.	*16½–17¾	15⅛
Same Preferred	*98–101	96¼
Container Corp.	12¾	12⅜
Cont. Diamond	*7¾–7⅞	7⅛
Crown Zellerbach	11⅜	10¾
Same Preferred	86½	83½
Dixie-Vortex	*8⅛–8⅜	8
Same "A"	*34–35	33
Robert Gair	2	1⅜
Same Preferred	10¼	10¼
Gaylord Container	9¾	10
Same Preferred	*51–52½	47
International Paper	14⅞	14⅜
Same Preferred	59	57½
Kimberly-Clark	*27–28½	.....
MacAndrews & Forbes	*21¾–23	21⅛
Masonite	25¼	25½
Mead Corp.	6⅛	5⅞
Same Preferred	58	54⅜
Paraffine Cos	24	22
Same Preferred	*99–105	96
Rayonier	10⅜	9⅞
Same Preferred	25	23
Scott Paper	35½	32¾
Same 4½% Pfd.	114	114
Same 4% Pfd.	*107–110	107
Sutherland Paper	*17⅜–18	18⅜
Union Bag & Paper	9	8
United Paperboard	3½	3¼
U. S. Gypsum	46¼	43
Same Preferred	*168–171½	173½

New York Stock Exchange—Bonds

Abitibi 5%	.....	64
Celotex 4½%	95	93
Certain-Teed 5½%	84¾	83
Champion P. & F. Co. 5%	.....	101
Inter. Paper 5%	.....	104½
Inter. Paper 6%	.....	105

New York Curb Exchange—Stocks

Am. Boxboard	4	3½
Brown Co. Pfd.	.....	*15–17
Great Northern	.....	32¼
Hummel-Ross	.....	4⅝
Nat. Container	.....	9¼
St. Regis	2⅜	1¾
Taggart	.....	2
United Wall Paper	.....	⅞

*Closing Bid and Asked Prices

WATERFALLS MILLS SOLD TO BOARD CO.

The Waterfalls Paper Mills, Mechanic Falls, Maine, which prior to its closing in March, 1941, was engaged in the manufacture of high grade bond paper, has been purchased and taken over by the New England Board Mills, Inc., Boston, Massachusetts.

The New England company has announced a 24 hour day and a seven day week work schedule for its newly acquired plant. Approximately 40 men are employed on each of the three daily shifts, along with 25 to 30 machinists, carpenters, and electricians making a total of more than 150 employees.

With all four of the plants' paper machines in full production, the daily output of the mill is about 80 tons of .009 corrugating material and heavy wrapping paper. The manufacture of these products was first inaugurated by the Waterfalls plant when it was re-opened in September, 1941, under the ownership of A. Cooper and the management of G. T. Shipman.

Under the present process, all waste materials are used in the manufacture of the new product. Waste paper in bales is brought to the plant in freight cars and trucks that in turn carry away the huge rolls of the finished product.

Plans have been laid for workmen to make preparations for the installation of a new paper machine that will double the present production of the plant. The new machine, 240 feet long and 208 inches wide, will be one of the largest of its kind in the country, and when installed will occupy the full length of the machine room as well as two-thirds of the beater and finishing rooms. Two of the present smaller paper machines, two breakers and other equipment will be removed, a new concrete foundation laid, and the roof of the mill raised to accommodate the new paper machine.

To provide stock for the new machine, two huge beaters must be installed and two additional boilers to assure adequate steam for the conversion of waste materials into stock. It is estimated that it will be several months before the new equipment will be fully installed and in production.

According to papers recorded in the Androscoggin County Registry of Deeds office in Auburn, January 7, the amount of the purchase for the Waterfalls Mills by the New England Board Mills, Inc., was in excess of $600,000. A quit claim deed transferring all the Maine company's holdings in Mechanic Falls, Poland, and Oxford, was filed together with a $550,000 mortgage. Also transferred to the Boston interests were extensive flowage rights on the Little Androscoggin River, Waterhouse Brook, Lower, Middle and Upper Range Ponds, Winter Brook, Tripp Pond, and at Welchville. The quit claim deed revealed that the cash involved in the transaction was approximately $75,000, covering 14 parcels of property.

G. T. Shipman, manager of the Waterfalls Mills for the Cooper interests, will continue in the same capacity for the New England Board Mills, Inc.

◆

WIS. PAPER GROUP ELECTS OFFICERS

C. W. Hoeper, Peshtigo, Wisconsin, has been elected president of the executive committee of the Wisconsin Paper Group succeeding R. J. Sund, Menasha. Other officers are W. K. Austin, re-elected vice-president; L. O. Schubert, elected secretary-treasurer; and Irwin Pearson was retained as executive secretary.

The Wisconsin Paper Group is a non-profit organization for providing schedule pool carload freight delivery service to customers of Wisconsin paper manufacturers and converters, with offices and warehouses at Menasha.

Reports submitted at a recent meeting attended by 55 executives of the 29 member mills indicated that tonnage cleared through the facilities of the organization exceeded any previous year. Arrangements have been made for shipments of 3,100 pool carloads of paper and paper products to 248 cities in 40 states and Washington, D. C. As a result, the regularly scheduled pool car service will be further increased in 1942.

◆

NO. CAROLINA MAY DEVELOP ILIMENITE

A possible domestic source of ilimenite, the ore of titanium, was revealed when the North Carolina State Board of Conservation and Development, meeting January 21 in Raleigh, approved in principle a proposal that may result in developing the "black sands" of Albemarle Sound into a million-dollar industry for eastern North Carolina.

Titanium is used as a pigment in the manufacture of paper, the production of high quality white paint, and in making rayon and other synthetic fabrics.

The board was informed by representatives of the du Pont Company that the "black sands" may yield ilimenite in sufficient quantities to justify large scale development. The company has already made laboratory tests, it was announced, and was contemplating

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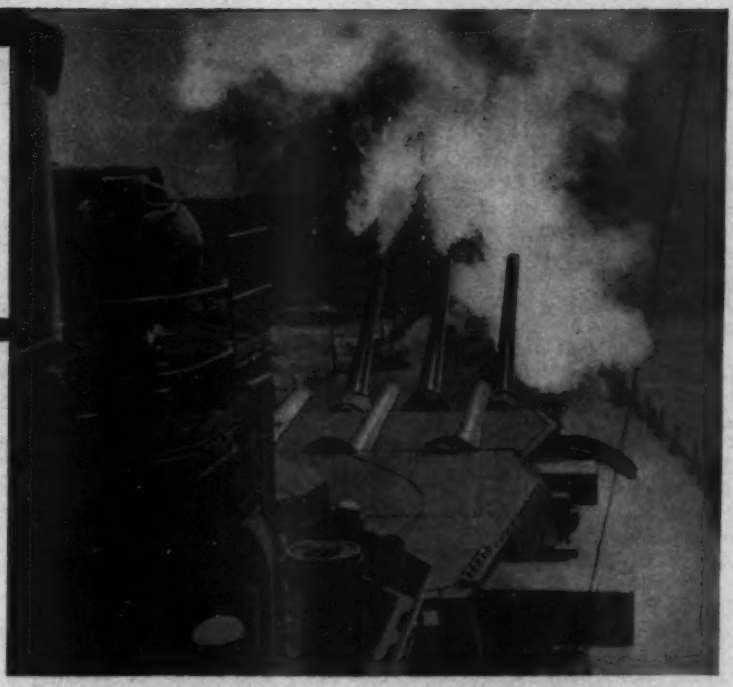

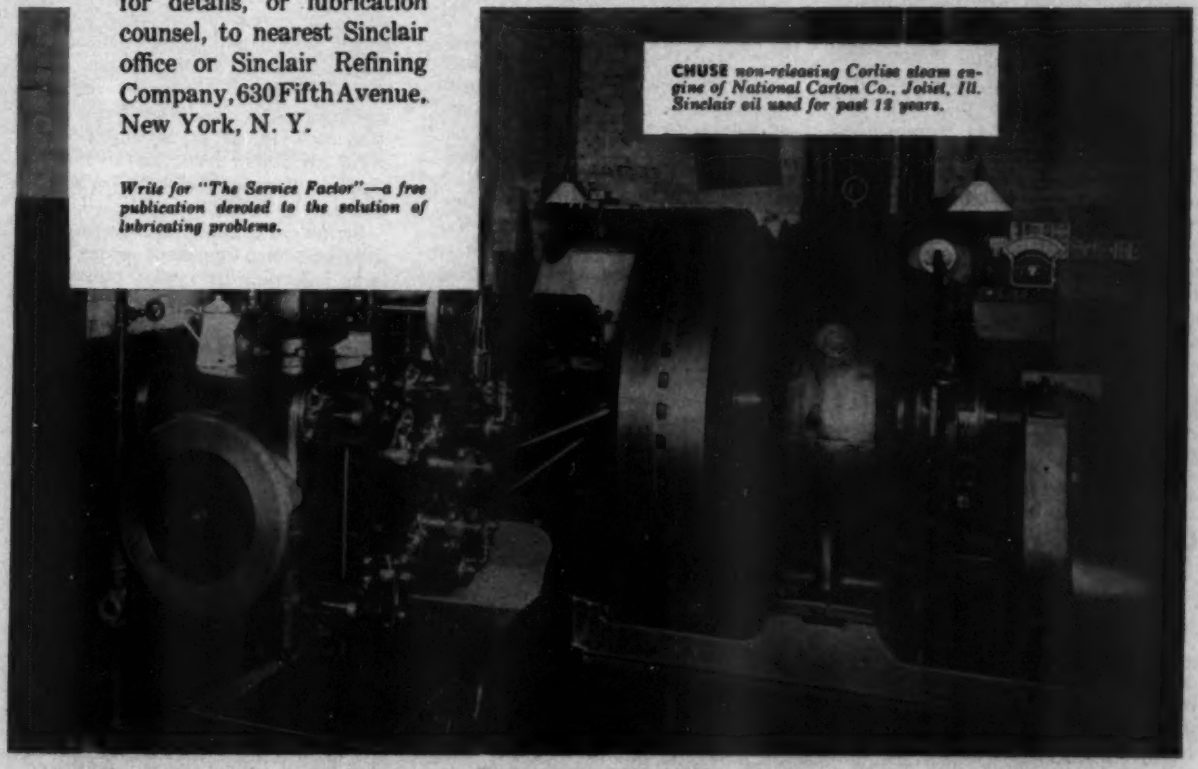

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erection of a pilot plant to determine the most effective methods of recovering the ore.

A committee composed of W. Roy Hampton, of Plymouth, and J. W. Bunn and Irving F. Hall, of Raleigh, was named to draw a proposed contract under a 1937 state law enabling the State to enter into agreement with private enterprises for development of public domain. The Sound bottom is owned by the State because it is beneath navigable inland water.

Former imports of titanium from India have been so drastically curtailed by war conditions that reserve supplies are now being used, according to H. E. Ford, of the du Pont development division, who added that domestic supplies must be developed either in North Carolina or elsewhere. Deposits of the ore are now being worked in the Adirondack Mountains.

Mr. Ford and H. Harry Miller, of the du Pont legal division, were presented at the session of the state board by State Senator Carl Bailey, who has sought development of the "black sands" since 1936. Until the war cut imports from India, his efforts were unsuccessful because of the low ore content of the sands and the cost of extracting the mineral compared unfavorably with prices prevailing on imports.

Recent laboratory tests, Senator Bailey said, indicated recovery was possible in sufficient quantities, if other processes proved feasible, to justify proceeding with commercial operations. He said the Albemarle Sound area offered an ideal location because it was land-locked and was not subject to rough seas which would impede operations on ocean beaches. He also pointed out that the Inland Waterway, passing through the Sound, offers cheap barge transportation to northern factories.

◆

CO-OPERATE TO SHIP PULP FROM CAN. DUTY FREE

The situation resulting from shipments of Canadian jumbo roll fourdrinier products claimed to be duty free as pulp is being clarified. Several shipments of such material, including 100 per cent groundwood, 100 per cent sulphite, and mixtures of pulps, have been classified for duty as paper not specially provided for. The present procedure, however, is for the Canadian producers to so mutilate such shipments that the material cannot be used for any form of paper. It can then be admitted duty free, either as paper stock or as pulp. The Import Committee has co-operated with Canadian producers in making it possible for Canadian producers to ship fourdrinier material to American buyers of pulp in this manner without payment of duty.

The State Department has announced that a Reciprocal Trade Agreement with Peru is to be negotiated, and public hearings were held February 2, 1942. All briefs relative to changes in tariff rates must have been filed by January 24. A brief will be prepared by the Import Committee requesting concessions which may seem desirable to domestic exporters.

◆

NEW DIV. OF PRICE CONTROL IN CANADA

An entire new division of price control administration, with a unit of five administrators, operating under a co-ordinator has been set up under the authority of the Wartime Price and Trade Board for the price control of pulp and paper in Canada. The new unit is under W. H. Howard, K. C. of Montreal as Co-ordinator.

Associated with him are: W. H. O'Reilly, paper board administrator; F. C. Hayes, vice president of Shipping Containers, Ltd., administrator of shipping cases, corrugated boards and solid fiber; C. M. Matheson of Fraser Company, Ltd., pulp administrator; G. Meredith Smith, C. A., of P. S. Ross & Sons, newsprint administrator; S. Harvey Smith, of St. Maurice Valley Paper Company, administrator of wrapping paper and multi-wall sacks.

◆

JUNIOR COLLEGE TO OFFER COURSE IN INDUS. CHEM.

A course in industrial chemistry is being offered at the junior college, Everett, Washington, for the benefit of the pulp and paper industries in the vicinity. The course was started in January of this year and will run for fifteen weeks.

The first unit of the course will be devoted to physics, matter and its properties, motion and velocity, gases, heat, and light. The second unit will be on theoretical chemistry, dealing with the properties as related to the manufacture of pulp and paper. The third unit of practical chemistry will study sulphur, calcium, magnesium, and other chemicals dealing with pulp and paper manufacture.

The class will meet twice a week in the evenings for a fifteen-week period. The course will cost $15 and although it is designed especially for pulp people, the course will be open to anyone interested.

BROMPTON GETS LAKE SULPHITE RED ROCK MILL

At a meeting held in Toronto, January 6, the secured and unsecured creditors of the Lake Sulphite Pulp Company, Red Rock, Ontario, voted to accept the offer made by the Brompton Pulp and Paper Company, Bromptonville, Quebec, to purchase the assets of the company.

The arrangements provide that creditors will receive pro rata distribution of $500,000 debenture stock of Brompton Company, less certain deductions. Mr. Currie informed the unsecured creditors that all other negotiations for rehabilitation of the company had been terminated. The meeting was also advised that $50,000, or some 10 per cent of unsecured creditors' claims, would be available for distribution.

◆

CANADA CLASSES PULP AS EXPORT

Certain pulpwood products have been placed on the list of articles for which an export permit must be obtained before they are shipped out of Canada because of the serious local shortages following heavy demand. According to Trade and Commerce Minister McKinnon, the intention is to avoid any undue dislocation of normal supplies of pulpwood both for Canadian and United States mills.

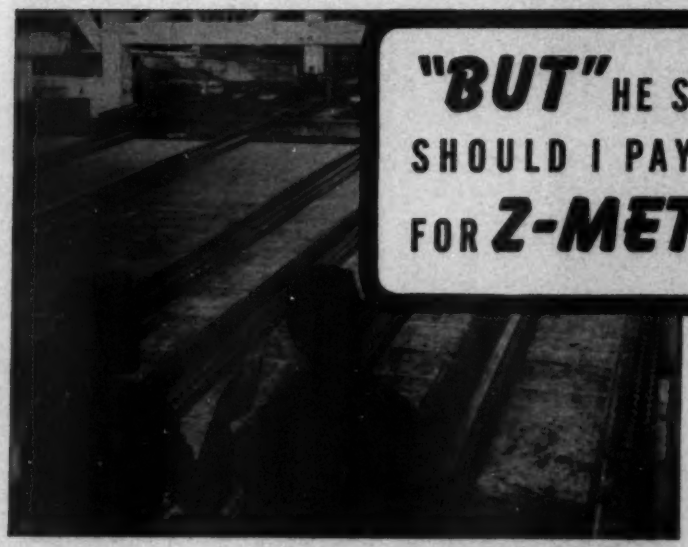
Permits are required covering all shipments from Canada of spruce, hemlock, jack pine or poplar pulpwood, either in the form of cordwood or logs according to an order made effective February 1. Applications to export pulpwood must be referred by the export permit branch of the Department of Trade and Commerce to A. S. Nicholson, Timber Controller under the Munitions and Supply Department.

◆

USE OF YELLOW INK CURBED BY CHAMPION CO.

"Help beat the yellow Japs by saving yellow inks" is the newly adopted slogan of the Champion Paper and Fibre Company, Canton, North Carolina, in an effort to save lead and chromium for essential war purposes. The use of yellow ink will be discontinued at this company's Canton (N. C.) and Hamilton (Ohio) plants for the duration of the war.

The only exceptions to this rule will be in the printing of four-color processes, and also when used for such commercial printing as packages and labels where the color is an important item of identification.



"BUT" HE SAID, "WHY SHOULD I PAY A PREMIUM FOR Z-METAL?"

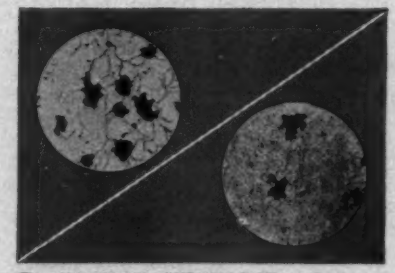
*THE REX MAN

. . . AND THIS IS WHAT I* TOLD HIM . . .

① **"MAYBE Z-METAL** chain belts last longer," this superintendent said. "But is this worth the premium that you are asking me to pay? Sure, I want all the durability I can get, because breakdowns these days are more than a nuisance."

② **"BELIEVE ME,** if they cost twice as much, they would still be worth it! They not only last a *little* longer than ordinary chain belts—they last a *whale of a lot longer!* They're not only a little stronger —*they're over 25% stronger!*"

③ **"NOT ONLY THAT,** Z-metal chain belts offer you practical immunity against moist conditions. These three factors of greater strength, much longer life, and resistance to corrosion mean a far greater return on your investment."



④ **"Z-METAL'S SUPERIORITY** is fact, as these micrographs show. Above is the structure of good malleable iron; below is that of Z-metal. When you think that Z-metal only costs you a little more, you'll marvel at their longer service."

⑤ **"Z-METAL CHAIN BELTS** can replace conveyors like these on the same sprockets without any expensive changes, and better than double their life. They've done it for many other mills, and I am sure they can do it for yours."

⑥ **"WELL, I BELIEVE** you've sold me," he said. "After all, if I can get that kind of durability for just a little more money my figures show that a Z-metal chain belt can pay for itself in a hurry through eliminating frequent delays and repairs."

Z-metal chain belts are hard at work these days in lumber and pulp mills the country over. They've answered a variety of problems for others; they can do the same for you. Naturally, orders bearing highest priority distinction take precedence. Chain Belt Company, 1717 W. Bruce Street, Milwaukee, Wisconsin.

REX CHAIN BELTS

CHAIN BELT COMPANY OF MILWAUKEE

Baldwin-Duckworth Chain Belt Division, Springfield, Massachusetts • Worcester, Massachusetts
Rex Chain Belt and Conveyor Divisions, Milwaukee, Wisconsin

REX CHAIN BELT COMPANY

FOREST PRODUCTS LAB. INCREASES WORK-WEEK TIME

The Forest Products Laboratory, Madison, Wisconsin, has increased its work-week by five hours for the duration of the war to speed wartime research, according to Carlile P. Winslow, laboratory director. The new schedule means a 44-hour week for regular and field staff employees and went into effect January 26.

There will be no overtime compensation, since employees are paid on a yearly basis. Work hours are from 8 to 5 on weekdays and from 8 to 12 on Saturdays. The increase was made necessary by a constantly increasing load of research work affecting the production of airplanes, munitions, and other military supplies, as well as the development of substitutes for needed defense materials.

◆

66 MILLS OFFER MACHINE SHOP TIME TO GOVT.

E. W. Tinker, executive secretary of the American Paper and Pulp Association announces that in answer to the WPB's request concerning idle machine shop time, there have been 66 machine shops that have been offered by various paper and pulp manufacturers to aid in the all-out effort to utilize all idle machine tool time.

Norbert McKenna, chief of the pulp and paper section, in a letter to the APPA states that the WPB has given the pulp and paper branch the responsibility of converting the facilities of the industries under this branch into war work. The information concerning machine-shop facilities is an excellent approach to the problem, according to Mr. McKenna.

◆

SULPHITE PULP WASTE DOWN 9% IN WISCONSIN

Fiber loss in the manufacture of pulp, which has been an important cause of stream pollution in Wisconsin, was reduced by 9 per cent last year through the efforts of the paper industry, according to a report given at a meeting in Madison, January 9, of an advisory committee of the pulp and paper industry.

H. A. Rothschild, Neenah, technical director of the Kimberly-Clark Corporation, and chairman of the advisory group, said fiber loss last year amounted to 1.53 per cent of the manufactured pulp, as compared with 1.68 per cent in 1940, and that the proposed goal of no more than 1 per cent of such waste is being steadily approached.

Control of sulphite waste, which also presents a major pollution problem, has been facilitated through the formation of a sulphite pulp maker's committee in which 11 of Wisconsin's sulphite pulp mills are represented, according to Mr. Rothschild.

The cost of pollution control studies by the state committee cost $25,000 last year, and this figure is to be increased in 1942. J. M. Holderby, former superintendent of the Neenah-Menasha sewerage commission, will direct research work this year. The financing of the work is taken care of by the committee and the industry is assessed.

◆

CUSTOMS BUR. WILL USE TAPPI FORMULA TO TEST NEWSPRINT

The Bureau of Customs has decided that the TAPPI formula for testing paper shall be used to determine whether imported newsprint is duty free as standard newsprint, or subject to duty as being over 35 pound basis weight. This decision concludes a long series of conferences in which an effort was made to reach some basis for determining the dutiability of paper, when the weight element alone was in question. It had been claimed that Canadian paper was subject to so much absorption of moisture that paper manufactured to be within the definition of standard newsprint would weigh over the 35 pound maximum when tested at border ports. The Bureau ruling is that the weight shall be determined by the TAPPI formula under which it is tested after being conditioned in atmosphere maintained at 50 per cent relative humidity and 23 degrees centigrade. The Bureau finds that this method determines the weight of the paper under normal conditions. The action of the Bureau is in accordance with the proposal by the Import Committee of the American Paper Industry that the Government use this nationally recognized testing formula as the basis for its determination of weights of papers.

◆

TIRE RATIONING SLOWED DOWN FOR WISCONSIN LOGGERS

Federal authorities have indicated their willingness to loosen tire rationing restrictions for northern Wisconsin loggers so that there will be no slowing down of the production of either hardwood for defense construction or pulpwood for the state paper mills.

State Rationing Administrator Don T. Allen on January 28, requested that 5,000 tires be supplied during February and March for logging trucks operating in 18 northern Wisconsin counties.

The seasonal nature of these activities was pointed out by federal authorities, since most of the log hauling is done while the ground is hardened by frost. The counties in question had been alloted 384 truck tires for February, while the March quota had not yet been established.

◆

M & O WILL USE RAIL FACILITIES TO SAVE TIRES

Conservation of tires and truck equipment by adjusting the pulpwood hauling operations of the Minnesota and Ontario Paper Company, International Falls, Minnesota, will result in a saving of 500,000 truck miles, according to R. W. Andrews, senior vice president. The saving will be effected by using rail facilities.

Approximately 30,000 cords of pulpwood, which were formerly hauled directly to the company's paper and insulite mills in International Falls will be landed at the southern terminal of the company's logging railway to load on cars for shipment.

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C-Z ANNOUNCES NEW PLAN FOR REFORESTATION

A forest management program that will guarantee an adequate permanent pulp timber supply for Crown Zellerbach operations at Port Angeles, Washington, and will also provide a permanent income for Makah Indian wards of the Government at Neah Bay has been worked out, according to Don S. Donman, vice president of Crown Zellerbach, and C. R. Patrio, assistant regional forester of the United States Indian Service.

This new plan, which will be called the Neah Bay Tree Farm, will operate on a 50-year growing cycle, producing a sustained yield operation. The annual cut of 40,000,000 B. M. feet of pulp timber will be the annual reproduction and will equal the amount necessary to supply the Port Angeles operations.

Arrangements were recently completed whereby the Crown Zellerbach Corporation will replant a burnt-over area on private holdings with about 300,000 seedlings during January and February of this year. To supplement natural growth and assure complete stocking, cut-over areas on the Makah reservation and elsewhere are being periodically replanted.

BRIEFS

▶▶▶ A PAY ROLL ALLOTMENT plan for the purchase of U. S. Defense Savings Bonds has been put into operation for the employees of the Paraffine Companies, Inc. The plan will operate from coast to coast, including the 1,500 workers in the Pabco Emeryville (Calif.) plant. R. H. Shainwald, executive vice president of the company states that participation in the plan is purely voluntary, but that it has helped to boom Defense Bond sales in the company.

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▶▶▶ OLD MILWAUKEE (WIS.) CITY RECORDS, such as contracts, bids, purchase orders, etc., which have in the past been burned, are now being converted into cash. Joseph W. Nicholson, city purchasing agent, said that three tons of such papers were sold to a Milwaukee paper firm the week of January 11. It is estimated that 250 tons of other old records can eventually be sold.

◆

▶▶▶ WORK IS UNDER WAY on the addition to the mills of Price Bros. and Company at Kenogami, Quebec. The general contract for the erection has been awarded to the Foundation Company of Canada and the estimated cost of the structure is $160,000 with equipment.

◆

▶▶▶ THE MAINE STATE WPB OFFICE has given out information that at least two of the State's paper mills have converted their machine shop facilities to do war work. Because all Maine paper mills are located in the 300-mile coast defense area the names of the firms engaged in the work were not given.

◆

▶▶▶ PLANS HAVE BEEN APPROVED for a new addition to the mill of the J. R. Booth, Ltd., Ottawa, Ontario. The new building will be a three-story structure and will cost approximately $150,000 with the equipment. The erection contract has been given to the Foundation Company of Canada, Montreal, and work has already been started.

◆

▶▶▶ TRANSPORTATION PROBLEMS were discussed when, for the first time, representatives of pulp and paper manufacturing companies held a joint meeting with members of the transportation commission of the Mari-

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time Board of Trade at Moncton, New Brunswick. One of the decisions made at this special meeting was that the commission was to support any action to relieve shippers in the matter of demurrage on export shipments moving through maritime provinces' ports on other than bills of lading. Maximum prices affecting transportation were also discussed.

◆

▶▶▶ PAPER MILK BOTTLES are being produced at the rate of 600,000 and 800,000 a week by the Kalamazoo plant of Single Service Containers, Inc., according to Henry Haas, production manager. The plant was leased several months ago and production began in December. This factory employs 11 persons and supplies the company's midwest markets. One combination cutter-creaser-printer and one gluing machine are in use now. An additional combination machine is to be set up soon.

◆

▶▶▶ ALTHOUGH DEVELOPMENTS have been slow in taking shape, it is learned that articles of incorporation have been filed for the Flathead Pulp and Paper Company, which company proposes to build a sulphite pulp mill and newsprint plant at Polson, Montana.

◆

▶▶▶ JOHN R. KIMBERLY, of the Kimberly-Clark Corporation, Neenah, Wisconsin, has been promoted from consultant in OPM's industrial and office machinery branch to a post in the new division of industry operations of the War Production Board. He will supervise branches for industrial and office machinery, pulp and paper, printing and publication, transportation, farm equipment, and communications.

◆

▶▶▶ PERMISSION TO APPEAL the December 13 judgment of Justice W. E. Middleton in which he granted a motion which asked that the assets of the Abitibi Power and Paper Company, now in liquidation, be sold at public auction, was granted by Justice W. D. Roach, January 5. The case is expected to come before the Ontario Appeal Court around March, and it is believed by some that such a course will bring about a stay in the sale proceedings fixed by the court order for February 18.

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▶▶▶ THE ALL-AMERICAN PACKAGE COMPETITION, sponsored by the *Modern Packaging Magazine*, opened its eleventh consecutive year at the Grand Central Palace in New York City, January 21. More than 20,000 packages are on exhibit among which are: a new package for blood-plasma, a safe and economical shipping container for airplanes and airplane parts, a unique package for spaghetti, etc. This exhibit will be open for the public through March 10, 1942, and the announcements of awards will be made in early April.

◆

▶▶▶ STOCKS OF WRAPPING PAPER and paper bags are adequate for normal use unless people begin to hoard, according to William Crowley, general manager of the General Paper & Supply Company, Madison, Wisconsin. Mr. Crowley added that paper mills, through rearrangement of their production methods, have prepared to meet increased demands by the Government and at the same time continue the normal supply for civilian use.

◆

▶▶▶ A FERRY SERVICE has been started by the Sorg Transportation Company, a subsidiary of the Sorg interests. The service will be carried on between the newly acquired pulp mill at Port Mellon, British Columbia, and Vancouver.

◆

▶▶▶ PRODUCTION OF PAPERBOARD, box board, and test liner has been started at the re-established Western Board and Paper Company, Kalamazoo, Michigan, which was taken over in the fall by Leon and William Slavin. About 85 tons of board are being produced on the one machine daily, and production will be stepped up to 150 tons. Most of the waste paper collected by the Michigan Paperstock Company, the original enterprise of the Slavins, is going to the Western Board mill. The mill employs about 150 persons.

◆

▶▶▶ A $30,000 BRICK ADDITION will be built by the Hammermill Paper Company, on its bleach plant at Erie, Pennsylvania, according to a report issued by the Pennsylvania Department of Commerce on industrial expansion in the state.

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▶▶▶ IN A REVIEW OF THE FOREST INDUSTRY in Nova Scotia in 1941, Honorable J. H. McQuarrie, Minister of Lands and Forests for Nova Scotia, stated that this great industry had cut a total of more than 520,000,000 board feet, valued at over $15,000,000, of which the total sawn lumber comprised 400,000,000 board feet and pulpwood about 172,000 cords. Most of the 172,000 cords was manufactured into newsprint and pulp in Nova Scotia.

Editorial

"1942 Will Reward the Fighters"

▶▶▶ MEASURED BY THE GOVERNMENT'S gauge, which is the Federal Reserve Bank's Index Production figure, the indicated consumption of paper products in the United States was approximately 21,000,000 tons for 1941.

The rise in the production index for 1941 was most impressive and decisive. It started in January, 1941, with 140 and ended in December, 1941, with 168, an average of 156 for the year against an average of 123 in 1940.

The average indexes for former years are enlightening:

For 1929.....110 Average
For 1937.....113 Average
For 1940.....123 Average
For 1941.....156 Average

What the average for 1942 will be is difficult to predict. That it will be materially higher is already a certainty.

Assuming that the average production index figure for 1942 will be 175, the indicated consumption demand for paper products will total 23,636,000 tons for the year. It may go higher. The great impetus in the rise is found in the staggering gains made month after month in the Federal Defense-War expenditures.

In January, 1941, expenditures were $569 millions.

In December, 1941, expenditures were $1,847 millions.

Total expenditures for the year were $12,528 millions or an average of $1,044,000,000 per month.

In 1942, the estimate is that expenditures may average $2,500,000,000 per month, an all-out total of $30,000,000,000 for the twelve months. We see no reason why this program shall not be fulfilled. The money is appropriated, the men are being rapidly trained; the factories are already being streamlined for all-out mass production; the organization has been set up with adequate executive authority to see it through.

Donald M. Nelson, a big, two-fisted production expert with no illusions whatever as to what it takes to attain the objective, recently told big business bluntly in New York that he wants production—not argument.

"Turn out the stuff and argue about costs later. Turn it out by inefficient methods, if necessary, and figure out better ones as you go along—but get the stuff moving whatever happens." And he means it and is going to get it.

That is the spirit in which we are tackling the war job at the start of this year. And that is the leadership which industry and business has been craving since the defense program was started. This challenge, American industry will accept and meet.

With a demand for all defense-war production of such proportions ahead of it, the paper industry has but one thing to do—comply with the demand. It is too early yet to get the real production figures on paper products for last year, but if it proves correct that this industry of ours made about a twenty per cent increase over the 1940 production figures, then our supplies about equalled our consumptive demand of 21,000,000 tons. That is a magnificent showing, if true, and the indications are that it is. Nobody ever dared to predict such an increase. But, if we did it last year, we certainly will make a substantial increase in 1942.

Basically, the preliminary figures must be correct, because the paper industry in its over-all operations shipped its customers as much paper products in 1941 as it did in 1940, and, in addition, filled every Government defense war order without delay. The year 1942 will reward the fighters and the paper people are fighters.

Prepare for the Worst—Look for the Best

▶▶▶ THE PEOPLE OF THE UNITED STATES are not war-minded. Most of us do not like war. Most of us do not want war. Most of us prefer to live and let live.

We are a freedom-loving people. We like freedom of expression, freedom to do what we want whenever we want to do it.

The cornerstone of our democratic way of life has been freedom—freedom to worship God as we choose, freedom to think and to act, and freedom to pioneer—to go places, to seek new pastures, to try untried things.

With this heritage, it is remarkable to observe how quickly we accustom ourselves to restrictions. At the outbreak of war, it was only necessary for the leaders of our Government to tell the citizenry what was needed to win, and almost immediately the common thought became an all-out effort to do that job.

The pulp and paper industry early fell into line. It presaged a paper shortage before it occurred and organized itself to meet the situation and from all appearances it is doing a splendid and commendable job.

In order that every mill may continue to wage its battle of production, it must not fail to put into operation some definite and well-organized plan of plant protection. Don't say, "It can't happen here." Protect your mill, if it hasn't already been done, against any contingency. Be ready if the need arises.

The Office of Civilian Defense, Washington, D. C., has issued several publications of great value. One of these publications describes a general plan of plant protection which should prove of help in getting organized; another treats extensively of protective construction; and a third is literally an encyclopedia of information on the subject of blackouts.

Obtain these publications without delay and any others that may be available through government agencies and elsewhere. Study each one of them carefully and then set up such a plan of plant protection as best meets the individual needs of your mill.

If the plan is never needed, so much the better; but remember that precaution is an offensive that is hard to beat.

ADVERTISING PAGES REMOVED

Current Thought

WE'LL KNOW BETTER SOMEDAY

WILLIAM SIBLEY

▸▸▸ WONDER WHATEVER BECAME of the little bags of asafetida we used to have hung around our necks as children? It was supposed to immunize us from every sort of evil from dandruff to ingrown toenails (not to mention the things in between like scarlet fever and measles), but what really happened was that it kept us from making appreciated friendships or getting into the good graces of our grade school teacher. Hung around the girls' throats its chief effect was to keep the boys at a safe distance! . . . Yes, asafetida is a laughing matter now—but it wasn't then.

Did you ever stop to think how things like this change in just a few years? I have recently been reminded, of how the medical fraternity so frequently turns ideas and procedures upside down, by my secretary. She is a splendid girl who has been working with me for nearly fifteen years. Just lately she has spent considerable time, money and thought on something she never heard of when she came to work with me—Allergy! She has been troubled with migraine headaches, and she has undergone a long series of injections in a medical effort to determine the things to which she is allergic. My, oh my! Maybe there is something to it, but I'll bet you a Dobbs hat against a doughnut with a hole in it that allergy will be as old-fashioned as gout, salivation, seven-year-itch, strawberry rash, or painters' colic, by the time her oldest is grown up.

I can remember my dad carrying a buckeye in his pocket for years under the deep conviction that the gradual petrifying process within the buckeye drew out and absorbed any possibility of his having rheumatism. We can all remember when appendicitis was a brand new disease—and some of us were of the conviction that many surgeons sliced open the torsoes of patients needlessly, simply because they called the old-time stomach-ache appendicitis. More than that, most of us can recall the time when lumbago among the whites and the "miseries" among the negroes, has more recently become neuritis. And it is no hardship for any of us to recall the day when we took sulphur and molasses as a spring tonic—not to forget doses of calomel, blue mass, lard and turpentine, and mustard plasters.

Yes, therapy changes with the advance of time,—thank goodness! With all the possibility of many of present day beliefs falling by tomorrow's wayside, we feel that we are far better off than many of our forebears. Grandfather Sibley, who distinguished himself in the Civil War, was "bled" for any one of several ailments. Going back to the days of the Pharaohs, when a baby cried the medics of that early day gave it a soothing syrup compounded of fly specks and an unknown kind of seed!

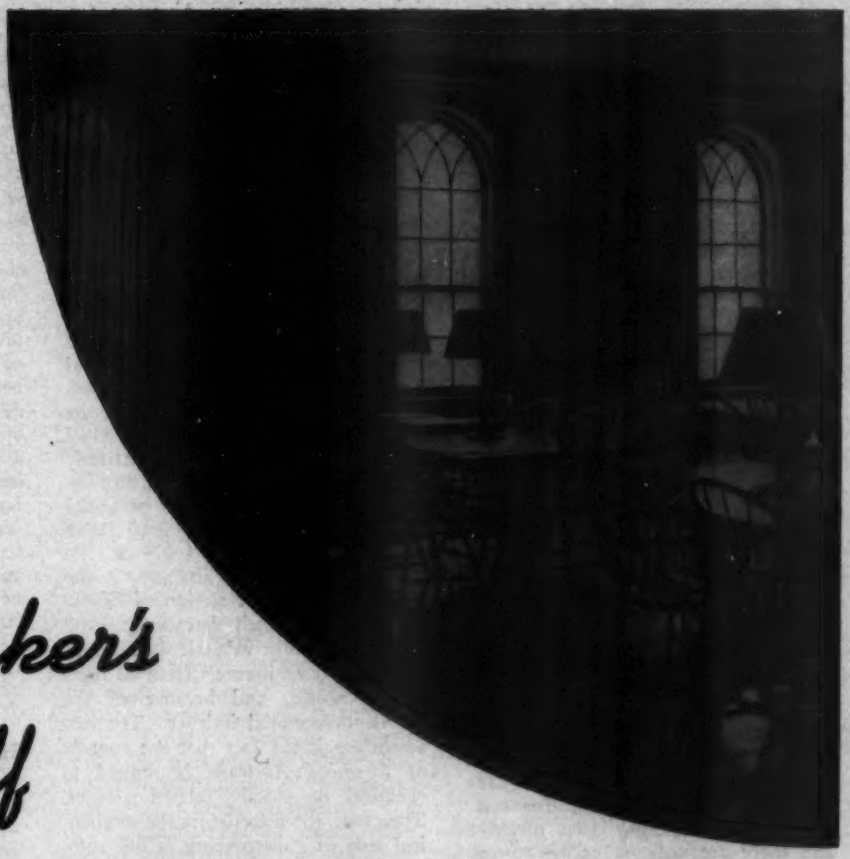
Speaking of the Pharaohs, a Queen of the third dynasty (Good Queen Schesch) encouraged the growth of her hair by generously applying her royal scalp with a concoction made of equal parts of the heel of an Abyssinian greyhound, date blossoms, and asses' hoofs—boiled in oil. As for the men of her time, baldness was cured by the free application of fats—such fats being taken from the horse, the crocodile, the hippopotamus, the cat, the snake, and the ibex.

But, you might remark, "back in the old days they had no skilled scientists, no laboratories, no research." And the answer to that should be: "The dickens they didn't!" They had what *they* considered laboratories, research, physicians and scientists. You recall the name of Pliny, of course, as being one of the most eminent of Rome's doctors and naturalists. Well, *he* it was who, in a time of plague, said: "If the fish called the sea star is smeared with foxes' blood and then nailed to the upper lintel of the door with a copper nail, no noxious spell will be able to obtain admittance, or, at all events, be productive of ill effects." And Pliny was the Mayo, the Johns Hopkins, the Billings, of his day.

The Romans, like the early Turks, Arabs, and Spaniards, placed great store in amulets, or charms. During the twelfth to fifteenth centuries, had you been in Spain, you would have known much of (and doubtless believed in) the bezoar stone—a stone which was supposed to expel poisons. Throughout at least three centuries it was relied upon as a cure-all, and was given internally and carried as charms. Avinzoar, one of the most outstanding doctors of the twelfth century (Spain) defined its origin as being "from the eyes of the stag. Stags eat serpents to make them strong, but they at once run and stand in river water up to their necks to counteract the injurious effect of the serpentine diet. This standing in the river stream attenuates the poison and then a liquor exudes from the stag's eyelids, which coagulates and forms a stone, which is the famous 'bezoar'."

During the middle ages the prescription for apoplexy called for a mixture of lion's flesh, ants' eggs, and oil of scorpion. Manifestly the up-to-date cut-rate pharmacist of that day would have to have a zoo at his back door. But that shouldn't worry him as much as the habit of the seventeenth century folks who deprived the pharmacist of profitable trade by using the pill perpetual. This pill (metallic antimony) could be used over and over as a cathartic by every member of the family, then be willed by its owner as an heirloom to posterity. Then, of course, there was a prescription assigned by Revolutionary War physicians for various maladies, which called for the swallowing of a pill made from moss taken from the skull of a man who had died by hanging. Pretty thought, isn't it?

Yes, in former years the King got sick and he took antimony. The King got well. Therefore, the antimony worked. Nowadays we have allergy. My, oh my!



A corner of the James A. Kimberly Memorial Library at the Institute of Paper Chemistry, Appleton, Wisconsin. A painting of Mr. Kimberly hangs on the wall.

A Papermaker's Bookshelf

▸▸▸ A GREAT MANY YEARS AGO, Dr. Charles W. Eliot expressed the idea that "a five-foot shelf would hold books enough to give, in the course of years, a good substitute for a liberal education in youth to anyone who would read them with devotion, even if he could spare but fifteen minutes a day for reading." In 1910, Dr. Eliot was given the opportunity to prove his statement. The result was the well-known Harvard Classics, more commonly known as the Five-foot Bookshelf. Since that time many people have prepared five-foot bookshelves for various purposes. The present article does not claim to be a five-foot bookshelf but it includes a list of those books which would be of value to one engaged in the pulp and paper industry.

The following limitations have been set up and will serve as a basis of selection. First, books out of print are not included even though they may be secured from second-hand book dealers. Second, books in foreign languages are excluded because, unfortunately, a large majority of workers in the pulp and paper field cannot read such books easily, if at all. Third, books dealing with the historical aspect of the industry are omitted, because the list is intended as a working library rather than a complete collection. Fourth, a large number of general reference books are omitted because this field has been thoroughly covered in a recent article by Bailey (*1*). Finally, no attempt will be made to discuss the value of a library in view of the fact that this subject is constantly kept before scientific and technical workers by various magazines (*2*).

Periodicals

Although periodicals are not books in the true sense of the word, everyone engaged in a given industry should read at least one trade periodical devoted to his field. This not only keeps him informed regarding the scientific and technical progress of his industry but it also gives him current information regarding construction, economic trends, etc. The paper industry is well represented by trade journals. There are five of these—three of which may be considered national in scope and two of regional scope. They are: THE PAPER INDUSTRY AND PAPER WORLD, *Paper Trade Journal*, *Paper Mill News*, *Pacific Pulp and Paper Industry*, and *Southern Pulp and Paper Journal*. Each has its particular function: The *Paper Trade Journal* contains the Technical Section of TAPPI, the *Paper Mill News* is the official organ of the Superintendents Association, THE PAPER INDUSTRY AND PAPER WORLD is edited primarily from the standpoint of management, although it also furnishes materials on recent technological developments, and the other two journals are devoted principally to problems of the Pacific Coast and the South, respectively.

Although strictly not a periodical, the Technical Association Papers may be included in this section. These Papers are a collection of all the papers presented at the Annual (Spring) and Fall meetings of TAPPI, together with the discussions following the presentation of such papers. The twenty-four volumes represent the best scientific and technical work of the American pulp and paper industry during these twenty-four years. Unfortunately, volumes 1-4, 6, 8-9, 11-12, 16, and 19 are no longer available through TAPPI.

In addition to the regular paper

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journals, there are a number of general industrial journals which are of considerable value. These include such magazines as *Industrial and Engineering Chemistry, Chemical and Metallurgical Engineering, Chemical Industry,* and the *Journal of the Society of Chemical Industry.* Not only do they contain occasional articles on pulp and paper manufacture, but they also contain valuable papers on related engineering subjects.

Bibliographies

It is hoped that the author may be pardoned if the *Bibliography of Papermaking* is mentioned. Two collective volumes (1900-1928 and 1928-1935) and five annual volumes (1936-1940) give a practically complete listing of all of the books and articles relating to papermaking which have appeared since 1900. This bibliographic series was made possible to the paper industry through the vision of TAPPI and the coöperation of the Lockwood Trade Journal Company. As far as is known, the paper industry is the only industry which can boast of such a service. It may be pointed out that a recent advertisement indicates that only 95 copies of the 1900-1928 volume and only 17 copies of the 1928-1935 volume are available for sale. The 1936 bibliography is out of print and there are only 31 copies of the 1937 bibliography in the hands of the publisher. These volumes will never be reprinted.

In addition to the periodical literature, United States patents have been covered in TAPPI publications since 1926. Up to 1930, these appeared in the Technical Association Papers and since 1930 in the annual bibliography.

Although too expensive to be considered as a part of a small working library, attention may be called to *Industrial Arts Index* and the *Engineering Index,* which cover a large number of periodicals and will lead to references on a wide variety of subjects.

Abstract Journals

A bibliography is a list of references on a given subject. An abstract journal is an annotated bibliography. Because such journals appear at periodic intervals, the references cover the complete field of interest and it is necessary to consult a large number of issues to secure the complete picture of any subject. If a bibliography contains references to the abstract journals it furnishes the ideal source of information.

Not only did TAPPI have vision when it set up its Committee on Bibliography, but it likewise established a Committee on Abstracts (in 1923 these two committees were combined). Because of this action, the Technical Section of the *Paper Trade Journal* (which was established in 1922) contains abstracts of periodical articles and patents relating to the industry. This material is readily accessible through the semi-annual indexes of the Technical Section. The abstracts were continued until 1939 when, because of the large number of technical papers, it was necessary to discontinue the abstracts. However, plans are now under way to publish the abstracts from 1939 as special TAPPI bulletins. As soon as accumulated material has been published, the abstracts will be supplied to the TAPPI membership in the form of a quarterly publication. For about four years before 1922, the abstracts will be found in *Paper and the Pulp and Paper Magazine of Canada.*

Another source of abstracts is the Cellulose and Paper section of *Chemical Abstracts* which dates from 1907 and is especially valuable because of the coverage of journals from all parts of the world, and because of the excellent decennial indexes. The disadvantage is the fact that the content of *Chemical Abstracts* is limited to chemical or closely related articles. Therefore, the material on the mechanical side of papermaking is not completely covered. *The British Chemical Abstracts* (Section B) also contains abstracts of articles and patents on cellulose, pulp, and paper. In general, these will also be found in *Chemical Abstracts.*

The Library Notes of The Institute of Paper Chemistry, which was started in 1930, presents the most complete picture of the periodical literature of the pulp and paper industry because it includes both mechanical and chemical articles. It does not cover patents. This journal is intended primarily for the membership of the Institute but copies will be found in the more important libraries throughout the United States.

Dictionaries

Although various books have carried glossaries which included some definitions of pulps and papers, the first real attempt to compile a dictionary was in connection with a program on the standardization of paper by the Bureau of Standards in 1921. With the co-operation of the American Paper and Pulp Association, definitions were prepared and published in the *Paper Trade Journal* and later reprinted under the title, "Classification and Definitions of Paper." A second edition was published in 1928. A much more ambitious effort was sponsored by the American Paper and Pulp Association with the co-operation of The Institute of Paper Chemistry which resulted in the publication in 1940 of *The Dictionary of Paper* (*3*). This volume represents the combined effort of the entire paper industry, because in its compilation assistance was received from hundreds of firms and individuals. It contains definitions of pulps, waste materials used by the industry, physical and chemical properties of pulps and papers, and of all know papers and boards. The book contains approximately 3,500 definitions and is by far the best work of its kind. Labarre (*4*) also prepared a dictionary of paper and papermaking terms but approached the subject largely from the standpoint of the lexicographer. The book is also written from the English point of view and, therefore, includes a large number of terms with little interest to the American reader. Mention might also be made of a less ambitious compilation by William Bond Wheelwright (*5*).

Handbooks

Although this bookshelf is confined primarily to works related directly to the pulp and paper industry, a few references to standard handbooks may be included, because of their value in answering many general questions which constantly arise to vex the worker. There are two such books in the field of chemistry (actually they cover physics and mathematics as well): namely, the Chemical Rubber handbook (*6*) (edited by C. D. Hodgman), and Lange's handbook (*7*). The surprising things about these books are: first, the frequency of revision (at least every two years) which ensures the most recent date; and second, the remarkably low price. The field of chemical engineering is well covered by Perry's *Chemical Engineers' Handbook* (*8*), prepared by a staff of some eighty well-known scientists and engineers. Mechanical engineering problems are covered by the well established books by Mark (*9*) and Kent (*10*). Questions relating to electrical engineering may be answered by the standard works of Fowle (*11*) or Pender (*12*).

Stevens' *Paper Mill Chemist* (*12a*) may be considered as a handbook for the paper industry; it covers methods of chemical analysis, fuels, water, raw materials, pulps, and paper analysis, and testing. Unfortunately, it has not been revised since 1926 and, therefore, does not cover the more recent developments.

Trade Directories and Catalogues

Although trade directories may not seem to have a place in this list, they are an important source of information concerning the mills manufacturing pulp and paper, their personnel, the sources of raw materials and of equipment, the manufacturers of various types of papers and boards, jobbers and dealers, trade associations, and other facts. Probably the best known is *Lockwood's Directory* (*13*). Others include *Post's Paper Mill Directory* (*14*) and *Walden's A B C Guide;* the *SOS Delivery* (Source of Supply) may also be mentioned (this contains no data on mills). A similar directory of Canada is published under the editorship of J. N. Stephenson (*15*). One interested in foreign mills will find such information in directories issued in England, Sweden, etc.

The *Paper and Pulp Mill Catalogue* (*16*) is a valuable source of information regarding the source of equipment for pulp and paper mills; in addition, it contains some 85 pages of tables of data on various engineering aspects of the industry. A more general source of such information is the *Chemical Engineering Catalog* (*17*), which lists sources of equipment and chemicals and contains a valuable list of books on the various aspects of chemistry. These two catalogues are in part a condensation of the catalogues of a large number of firms who take this way of bringing their products to the attention of the buyers and users of equipment. Because of this, the distribution is gratis, within reason.

Wood and Cellulose

The books listed under this heading relate primarily to the chemical properties of wood and its relation to the pulp industry. Two books appeared almost simultaneously in 1926 by Schorger (*18*) and by Hawley and Wise (*19*). The latter book is being completely rewritten, under the editorial direction of Wise, by fourteen collaborators, and should be available late in 1942.

The most important book on cellulose from a historical point of view is that of Cross and Bevan (*20*), which was first published in 1895 and reprinted in 1910. Although difficult to secure, mention should also be made of the four volumes by Cross, Bevan and Durée (*21*), which contain results of their researches and abstracts of work of other investigators. In 1924, a translation of Heuser's textbook (*22*) was published, a new edition of which is now being prepared by Heuser. Another book dealing primarily with cellulose is that of Marsh and Wood (*23*). A new book covering the entire field of cellulose and its derivatives is promised sometime during 1942. This is being prepared, under the editorial supervision of E. Ott of the Hercules Powder Company, by a large number of coauthors. The bio-chemistry of cellulose is well covered by the books of Norman (*24*) and Thaysen and Bunker (*25*). An example of a very specialized treatment of cellulose is Stamm's work on the colloid chemistry of cellulose (*26*).

Pulp and Paper Manufacture

Although there are several general books on the subject of the manufacture of pulp and paper, there is a very decided lack of specialized treatises corresponding to the excellent monographs published in German.

The most complete treatise is the *Manufacture of Pulp and Paper* (*27*), which was started in 1918 and has been supported by the American and Canadian pulp and paper industry. There are five volumes in the set; the first two deal with the fundamental sciences of mathematics, physics, chemistry, mechanics, and hydraulics. The third volume covers the manufacture of pulp, and volumes four and five, the manufacture of paper. The last three volumes have gone through three editions—the third edition being published over the period 1937-1939. One of great values of this series is the fact that each section has been prepared by an expert in that particular field. Although these chapters cannot be considered as monographs, the series as a whole represents the most comprehensive treatise available.

In 1920, G. S. Witham, Sr., published his *Modern Pulp and Papermaking* (*28*). This book deals particularly with the mechanical aspects of the industry and contains specifications for apparatus which can be found in no other volume. It is understood that Witham had practically completed a revision of this book before his death and it is anticipated that the new edition will be available early in 1942.

From the English point of view, mention should be made of the standard treatise by Cross and Bevan (*29*), the last edition of which was published in 1920, and the works by Clapperton (*30*) and Leicester (*31*). There is also the volume by Chalmers (*32*) which deals with the machinery used in the industry; published in London, it naturally treats the subject from the English rather than the American point of view.

The chemistry of the industry is covered very well by Sutermeister's volume (*33*). The third edition which appeared in 1941 adopts the new idea which is so prevalent in book making today — namely, of having various chapters written by experts. In addition to this general treatise on the subject, there are books on particular chemicals used by the industry. Examples of these are Sutermeister and Browne on casein (*34*), Bogue on gelatin and glue (*35*) and Lawrie on glycerol (*36*).

Analytical and Testing

TAPPI (*37*), through its various testing committees, has published a large number of chemical and physical methods for the industry. These form the basis for methods used by research laboratories and industrial organizations. The only valid criticism of these methods is the fact that revision is time consuming, because such revisions must pass through two or three committees and then be approved by the membership as a whole. As a result, the Forest Products Laboratory, The Institute of Paper Chemistry and a number of research laboratories in pulp and paper mills have prepared their own methods which are modified from time to time as experience may warrant. As an example of this, we have the work of Griffin (*38*), who edited the methods employed in the laboratories of Arthur D. Little, Inc.

The analytical methods in the examination of cellulose have been assembled by Dorée (*39*). More or less complete discussions of paper testing in general will be found in Sutermeister (*33*), in volume 5 of the *Manufacture of Pulp and Paper* (*27*), in Bromley and Shore (*40*), in Mitchell (*41*), and others.

Jahan (*42*) has covered the subject of paper testing from the standpoint of the printer and other consumers of paper. Because of his audience, the book is characterized by a lack of detail which would seem to be necessary to make it really useful in a laboratory.

Specialties

As one surveys the literature on papermaking, he is struck by the fact that there are practically no books on special types of papers. Therefore, if one is interested in such papers, recourse must be had to the periodical literature and, even here, there is a serious lack of information. An example of such treatment is the work of Wheelwright (*43*) on print-

ing papers. This book is also important because it is one of the few on the relation between the paper and printing industries. It is to be hoped that some day we may have a series of brief monographs dealing with the manufacture and properties of the more important classes of paper.

Government Publications

A very important source of information for the pulp and paper industry is the large number of publications originating from government laboratories and bureaus.

Raw materials (wood) are covered by the Forest Service of the U. S. Department of Agriculture; the work of the Service covers description and identification of various species, forest management, growth and yields, logging practice, etc. The Forest Products Laboratory at Madison, Wisconsin, is concerned primarily with the utilization of the raw materials as sources of pulp; it has made a very thorough survey of the suitability of American woods and has studied the pulping behavior of a number of varieties, the control of decay in pulp and pulpwood, the variables in the different pulping processes, etc. In recent years, most of their publications have appeared in trade journals or as processed reports. The Bureau of Chemistry and Soils of the Department of Chemistry has also carried out some investigations on pulp and paper.

The National Bureau of Standards has been concerned primarily with the development of methods of testing paper and studies leading to the preparation of specifications. Its researches formerly appeared principally in the *Technologic Papers* and later in its *Journal of Research* (these are reprinted as Research Papers). Another important function of the Bureau is the preparation of Simplified Practice Recommendations. During the present emergency it is also making an extensive study on building materials. It has also conducted studies on the permanency and aging of paper, the preservation of paper, especially in libraries, the protection of records, lithographic papers and printing, etc.

The Government Printing Office is interested in general in testing methods, and the printability of paper.

The Federal Government also issues "Federal Specifications," which form a part of the *Federal Standard Stock Catalog*. These were formerly approved by the Federal Specifications Board but now apparently are under the Director of Procurement. These are for the use of all departments and establishments of the Government and give general and detailed requirements, methods of sampling, inspection and test, and packing and marking for shipment. They also contain references to special departmental specifications. A complete list of these specifications will be found in Price List 75 (Federal Specifications) of the Government Printing Office.

Statistical information regarding the industry is collected by the Bureau of the Census, the Bureau of Foreign and Domestic Commerce and the Tariff Commission. The Bureau of Foreign and Domestic Commerce is concerned principally with trade conditions and opportunities, and the Tariff Commission with manufacturing costs in their relation to those of foreign countries and the need for protection of the industry.

The list of publications of these various government agencies is too long to be given in this article. Most of them will be found in the *Bibliography of Papermaking* under appropriate headings. Those which are now available for purchase can be ascertained through printed lists furnished by the Government Printing Office or by the respective bureaus. Current publications are usually noted by the Paper Industry.

Industrial Literature

The above heading is used to include manufacturer's catalogues, pamphlets, descriptive matter, etc. This material is normally sent upon request and if one rather consistently assembles and files such literature he will, in a few years, have a collection of invaluable data. Practically all trade magazines list those bulletins which come to the attention of the editor and others may be discovered through the advertising pages of these same journals.

The above discussion, as stated in the introduction, is designed to give an idea of those books which will be most useful to those engaged in the pulp and paper industry. The research worker, interested in a highly specialized field, will probably find little to interest him because, frankly, the list was not prepared from his point of view. Nor is it necessary that one secure all the books listed to have a fair working library. Without detracting from their value, it may be stated that most of the British books are unnecessary. As an aid in deciding what books may be purchased, the publishers and the prices are given in the following reference list.

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of Pulp and Paper Application

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▶▶▶ THROUGH its *News Edition* (19, 1172, 1941), *Industrial and Engineering Chemistry* announced *A Bibliography of Chemical Engineering Nomographs* filed by the authors with the American Documentation Institute, 2101 Constitution Avenue, Washington, D. C. The parent bibliography, from which the following references of pulp and paper interest are drawn, covers the quarter-century ending June, 1941; it lists four hundred and ninety-seven titles alphabetically by author and co-author. This bibliography includes a subject index, and may be obtained on microfilm or in photocopies readable without optical aid from the Institute.

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(Concluded on page 1082)

Hazards at Wet Felt Presses

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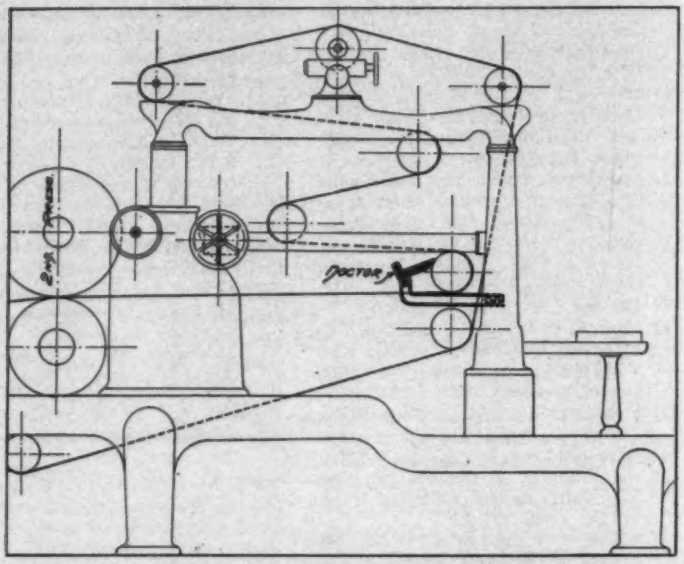


Fig. 1—Sketch showing location of doctor on felt carrying roll. Doctor prevents crumbs from forming on roll.

▶▶▶ WASHING FELTS is a job that must be done quickly and thoroughly. If the operation does not progress satisfactorily, or if it seems to take more than the usual time, there is apt to be a let down in the observance of safe practices, thus developing a situation under which serious accidental injuries are more likely to occur.

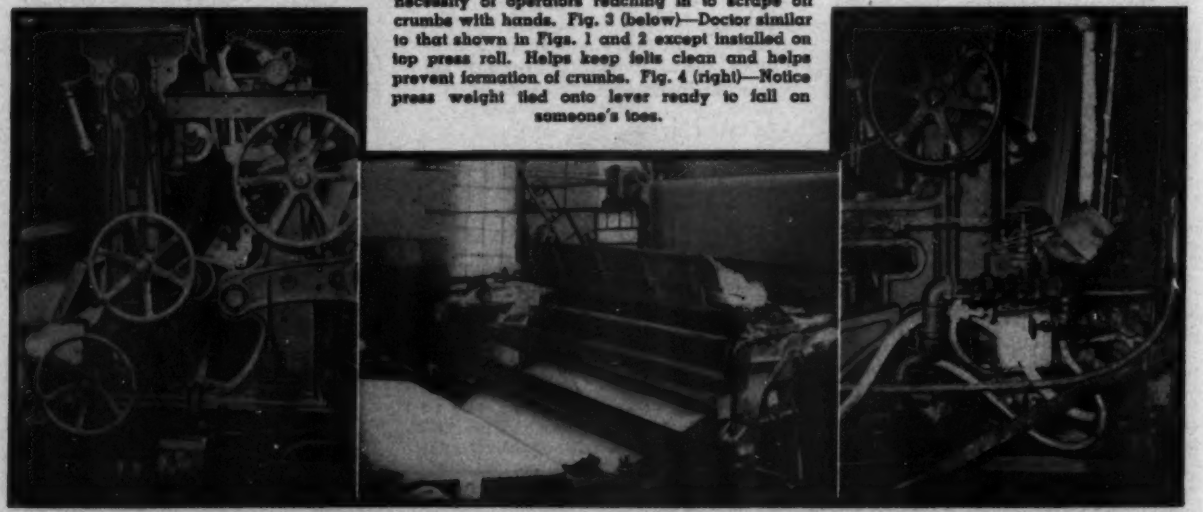
A machine crew, for example, was washing up felts. There seemed to be more than usual difficulty in pulling out the second press felt. The boss machine tender jumped up on the foot board, reached in to the other side to grasp and pull the edge of the felt at the point just before it ran onto the carrying roll. His hand was caught between the felt and the carrying roll, his arm drawn into the pinch and broken in several places.

This accident illustrates a type of accident that is probably the most serious of those which occur around the wet felt press section. In other words, it is generally known that a felt, after being washed, responds more easily and quickly if it is pulled at the point just before it runs onto a carrying roll. Most paper mills, recognizing this fact and realizing that it is a very serious, unsafe practice, have adopted rules that employees shall pull felts only on the side away from the inrunning nip. Foot boards, platforms, and other working surfaces located across the machine frame should be placed with this thought in mind. Since it is impossible to provide mechanical guards for this operation, the safe method must be followed to insure against accidental injury.

In dealing with the accident problem on paper machines, it is necessary to recognize that the paper machine itself is long lived. In other words, modern paper machine installations from an accident prevention standpoint have an advantage over machines that have been in operation over a period of years. Of course, it is possible to install modern equipment on older machines. However, it must be recognized that it is not always done and precautions should be taken accordingly.

Improved machine installations, one-sided felts, automatic guides, and felt conditioners make the accident prob-

Fig. 2 (left)—Illustration showing a doctor installation on a felt carrying roll. Notice crumbs that have been gathered off roll on doctor. No necessity of operators reaching in to scrape off crumbs with hands. Fig. 3 (below)—Doctor similar to that shown in Figs. 1 and 2 except installed on top press roll. Helps keep felts clean and helps prevent formation of crumbs. Fig. 4 (right)—Notice press weight tied onto lever ready to fall on someone's toes.



lem more simple. Without such advantages, accidents can be prevented only by the strict enforcement of safe practices.

Recently a machine tender was very seriously injured when he attempted to scrape off crumbs that had gathered on one of the felt carrying rolls by reaching in with his hand. Investigation discloses that many if not all machine tenders have done this thing time and time again. However, the time usually comes if a machine tender continues this practice that his hand is caught and drawn between the roll and the felt.

This condition can be corrected by the installation of a doctor across the width of the felt carrying roll or rolls. Figures 1 and 2 illustrate an installation of this kind. A further adaptation of the idea is the installation of similar doctors (Figure 3) on the press rolls. Such doctors not only eliminate the gathering of crumbs or lumps but also keep the felts in better and cleaner condition. A six machine mill, with the machines running on book and bond papers at approximately 600 fpm, have had all wet felt press sections equipped with doctors for several years. These doctors are installed on the presses and felt carrying rolls; and are considered necessary parts of press section equipment.

In some mills it is not unusual to see weights on the press weight lever stacked on top of each other or tied on with pieces of rope or wire. This practice creates a hazard which frequently causes a machine operator to suffer an injury to his foot or toe (Figure 4). Figure 5 reveals a method of arranging a press weight lever and weights to keep the weights in position and eliminate the hazard.

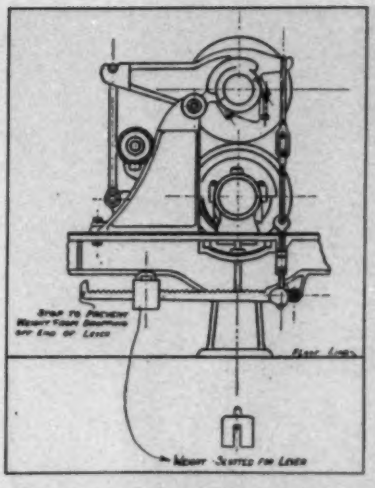


Fig. 5—Sketch illustrating device for press weights and lever so that they will stay securely in place.

Of necessity, the floors, foot boards and other surfaces around wet felt press sections are almost constantly wet. Therefore, the flooring at both the front and back sides of the machine at the press section as well as throughout the entire wet end of the machine should have sufficient drainage to prevent water and wet stock from lying around in puddles. An old wooden floor in an older type of mill recently was replaced with a cement floor. The cement finisher surfaced the floor to an almost glossy smooth finish, and in so doing created a very serious slipping hazard when the floor is wet with water and stock. Cement floors in any part of a paper mill should be roughened deliberately to prevent the slipping hazard—particularly in locations where the floors are more or less constantly wet.

Steps, walkways and foot boards across the width of machines at the press section should be equipped with non-slip surfaces, such as a patented non-slip metal covering, or a covering of old fourdrinier wire. A foot board with a regularly grooved wooden surface has been observed by the author in at least one mill.

All sections of the smaller, older type of paper machines commonly were equipped with quite small steps. The newer modern machines have larger stepping surfaces. The size of a man's foot is the same regardless of what machine he happens to be working on. It, therefore, is of advantage generally to provide more generous surfaces on existing step installations, particularly on the older type machines. Figure 6 shows how the steps on the side of a calender stack frame have been made safer. In this case a new step much larger than the old has been installed directly on the old step. The old step was just about large enough for a man to step upon with the ball of his foot. The new step is nine inches square with the edges and corners rounded. This installation was made with some skepticism because it was felt that a step nine inches square would be more of a hindrance than a help. After installation, however, it was found that the operators not only approved the larger step but voluntarily recommended the installation of larger steps not only on the other calender stacks but on other machine locations where steps are necessary. Employees at work around paper machines, either at the calender stack, press section, or elsewhere, need adequate footing; and find that the larger size steps definitely do not create any additional hazard

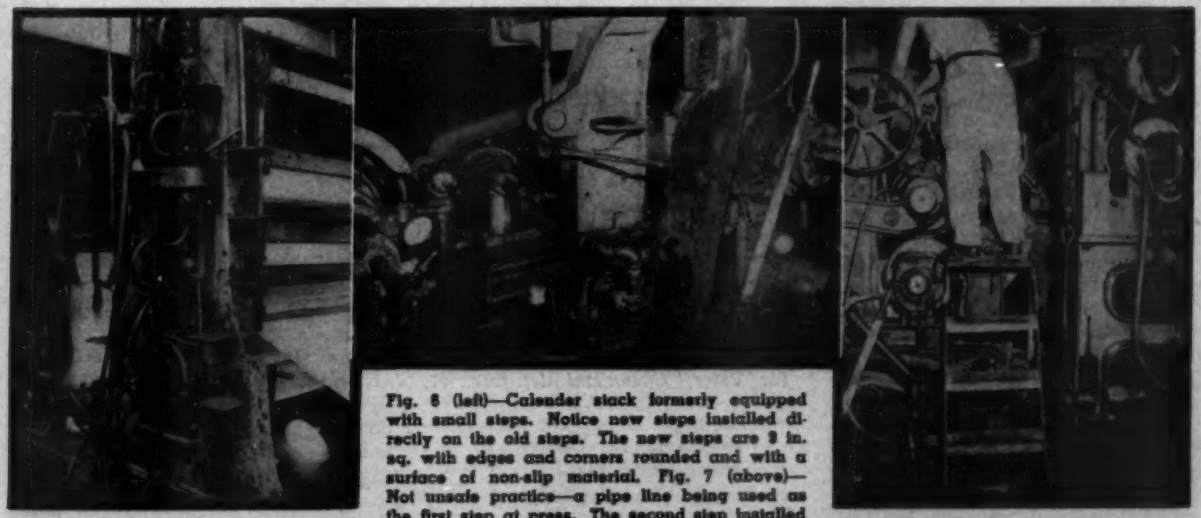


Fig. 6 (left)—Calender stack formerly equipped with small steps. Notice new steps installed directly on the old steps. The new steps are 9 in. sq. with edges and corners rounded and with a surface of non-slip material. Fig. 7 (above)—Not unsafe practice—a pipe line being used as the first step at press. The second step installed on side of frame is too small. Fig. 8 (right)—An improvement in the form of a movable set of metal steps at second press. Back tender stands on top platform to skin the press and throw the tail of the sheet into the rope carrier.

Fig. 8—Adequate steps should be provided at the back side of the machine. Note metal steps leading to platforms and footboards across the machine, all equipped with regulation hand rails.

but make the work much more safe.

Figure 7 illustrates a similar and common hazard at the press section. Not only does the length of pipe serve as the first step up to the foot board but the second step is so small that it serves only as a toe hold. Too often around the press sections employees have to use part of the equipment as a step up onto the foot boards. Many times steps are found broken or sprung out of shape. Proper installation of steps of sufficient size where needed will save many bruised shins and sprained ankles and will also help to speed up the operation of washing up by giving the employees adequate and safe footing.

Figure 9 emphasizes the fact that the back side of the machine should be given equal consideration to the front side for the maintenance of safe working conditions. It shows a set of metal steps leading to a working platform which in turn leads to the foot board across the press section, all equipped with standard hand rails. Too often the back side of a machine is considered out of sight and, therefore, is neglected without an attempt to properly guard the drives and provide safe working space.

In these days of unusual industrial activity, mill organizations are confronted with conditions that emphasize more than ever the need of concentrated effort to enforce measures to prevent accidents. Employees with attained skill cannot be spared from their jobs. Also, increased production means additional employees. The induction of employees into military service and the lure of jobs in defense industries has created a considerable increase in labor turnover. This shift in employment means that mills find it necessary to employ comparatively large numbers of new employees who are not familiar with either the operation or the hazards of the jobs at which they find themselves. Young men recently out of school, from farms and from other walks of life, are being taken into paper mills every day. These men have not worked around moving machinery. Therefore, it is necessary not only to give them preliminary instruction, but to give it continuously until they are familiar with the hazards encountered at their own jobs and around the mill premises.

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(Continued from page 1089)

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Recent Engineering Developments

Increase Production

Fig. 1—Simplicity of power layout characterizes the sectional electric drive at a new Southern paper mill plant.

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Westinghouse Electric & Manufacturing Company

▸▸▸ DURING THE PAST YEAR, increased production occasioned by the National Defense Program, together with rising taxes and material and labor costs, have made it necessary for pulp and paper mill operators to look to improvements in method of operation and equipment. A number of mills have found that production could be substantially increased by the removal of a bottleneck in some one department. In many cases, minor modifications of existing installations by newly developed devices have resulted in more effective utilization of machines. In other cases, replacements of old drives by efficient low maintenance modern drives have boosted output considerably. The industry is vitally interested in all types of equipment which will permit of higher operating efficiency and reduced cost of operation.

Outstanding Record with Sectional Drive

An outstanding performance record was made on the initial starting of a new 158 in. Black-Clawson fourdrinier powered by a Westinghouse sectional electric drive in one of the new Southern paper mills. Nine minutes from the time the gate of the headbox was opened, a clean, well-formed sheet of paper was on the reel and the machine ran without a stock break for six hours. This record is, indeed, a tribute to the operating efficiency and ability of both the mill personnel and the modern sectional electric drive.

Thus another outstanding mark can be chalked up for sectional electric paper machine drive. This type of drive, by the elimination of all line shafting, power belts, and clutches, assures greater productive efficiency. These benefits come from more accurate control of draw, increased flexibility, and reduced maintenance and operating cost. This modern drive has been applied to machines practically of every type and speed range.

The drive for the machine referred to consists of a 300 kw. synchronous motor generator set, with direct connected starting generator, 125 hp. motors for the couch and calender, 50 hp. for the presses, 75 hp. for the dryers, and 20 and 30 hp. on the smoothing press and reel. The fully automatic control provides the Westinghouse starting generator system for maximum flexibility when inching and accelerating individual sections, sensitive Westinghouse electronic voltage regulators which maintain uniform paper speed regardless of load or frequency changes, and quick response field forcing carbon pile speed matching regulators for accurate control of draw. The drive was designed for operating speed range of 200 to 1,000 ft. per minute paper speed.

The Southern plant mentioned is completely electrified and is modern in every detail. The plant has an installed generator capacity of 3500 kw. and an installed motor capacity of 5225 hp.—which includes 1850 hp. in synchronous machines. Practically all of the motors are of splash-proof or totally enclosed fan-cooled construction which assures adequate protection against moisture and maximum continuity of service with a minimum of maintenance.

Auxiliaries Turn to Sectional Drive

Sectional drive for the auxiliary processing machines in the pulp and paper industry offers operating advantages. This type of drive requires a minimum of floor space and eliminates all lineshafting, countershafting, open gearing, clutches, and slip belts, thus increasing efficiency and flexibility, materially reducing maintenance expense, and lessening personal hazards. The drive is of the variable voltage d-c. type with a suitable source of d-c. power supply, individual motors geared for driving each section of the machine, and complete control, tailored to meet individual operating requirements. The operating speed range required is obtained by voltage adjustment of the d-c. generator supplying power to the section motors. The motors are unregulated and are designed with the proper characteristics to inherently maintain substantially constant draw between sections over the entire operating speed range.

An interesting and unusual application of this type of sectional drive was made recently to a saturating machine for processing flooring felt. The machine consists of saturating, coating,

Fig. 2 (right)—Ease of control is featured in this centralized control cabinet for a sectionally driven saturating machine. An unusual feature is 3-second controlled automatic acceleration between threading and productive speeds by "fast-slow" push buttons.

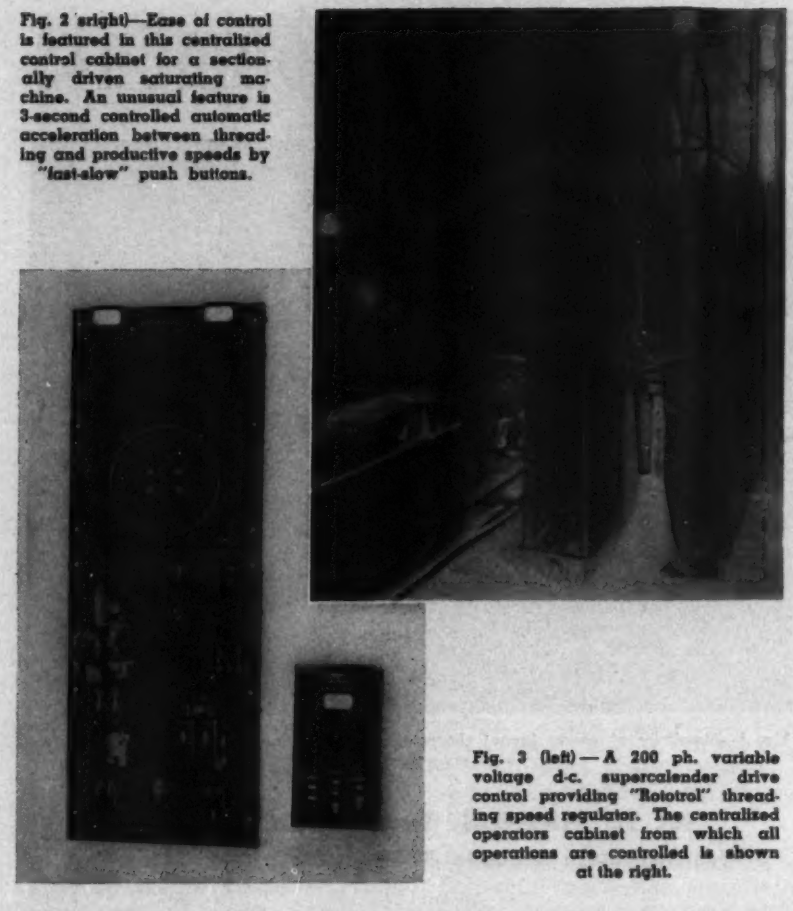


Fig. 3 (left)—A 200 ph. variable voltage d-c. supercalender drive control providing "Rototrol" threading speed regulator. The centralized operators cabinet from which all operations are controlled is shown at the right.

conveying and festooning sections which handle the continuous sheet of felt. As one roll of the raw felt is used up a splice is made to another roll to provide continuity of production. When this splice reaches the squeeze rolls the felt is soft and weak due to the presence of the wet saturant and will break unless the top roll is raised. For maximum production efficiency the drive is arranged for controlled automatic acceleration and deceleration between threading and productive speeds as the splice is handled. These operations are initiated by "Fast-Slow" push buttons situated on the master control cabinet.

Acceleration or deceleration of this entire machine takes place in less than three seconds. The individual section motor characteristics were carefully matched to permit of this rapid change in machine speed. Each design entailed careful consideration of acceleration characteristics as influenced by motor operating speed, connected inertia and armature circuit resistance. The flexibility and simplicity of the drive and its precise acceleration and deceleration resulted in high operating efficiency and negligible felt spoilage.

Precision Regulator Solves Speed Problems

In keeping with the National Defense Program, it is imperative that the pulp and paper industry obtain maximum output of quality product with a minimum of weight. These factors lead to strict drive requirements, and particularly on the paper forming machine, the winder and the supercalender, regulated drives assure higher operating efficiency and greater uniformity of products. A regulator for paper mill service should be sufficiently elemental in operation to be understood by non-technical maintenance personnel, stable and reliable for continuity of production, and should combine the necessary degree of sensitivity and amplification to function properly without the complication of supplementary amplifying devices. These qualifications have been adequately met with the "Rototrol" type of regulator which has recently been applied in considerable numbers in the paper industry.

The "Rototrol" was originally developed in 1930, and since then has been extensively applied to high speed elevator and variable voltage planer control. Its simple and sturdy construction is particularly suitable for paper mill service and it is applicable to virtually any direct current drive in the industry requiring precise regulation.

For instance, on supercalendered drives, productive speeds as high as 1500 to 2000 fpm are becoming common. For safety and economy these stacks must be threaded at approximately 50 fpm. The variable voltage direct current drive, except for its drooping speed load characteristics, is particularly suitable for this extremely wide speed range. Although the drooping load characteristics are not harmful at operating speed, it is detrimental at threading speed because the generator is operating at practically residual voltage and a small load change means a relatively large speed variation. Since normal load variation during threading may be two to one or greater, an unregulated drive on a high speed machine is subject to considerable speed variation. This speed variation is dangerous to the operators and since the stack has to be handled so carefully, threading is slow and operating efficiency is impaired. The "Rototrol" generator applied as a threading speed regulator automatically maintains a safe, uniform, threading speed and increases reliability and economy of operation.

A large Eastern mill recently installed a high speed supercalender drive with "Rototrol" threading speed control. The flexibility and simplicity of the drive and its precise control of threading speed resulted in a higher operating efficiency of the stack. The results at the mill were so beneficial that two additional units have been installed to replace older forms of drive, a fourth unit is on order, and two more units are being built for other mills of the same company.

The "Rototrol" has also been applied to a number of single motor paper forming machine drives as a speed regulator and to shaft driven reel drives as a sheet tension regulator. Operating results with this simple and accurate regulator have been most satisfactory. The "before" and "after" charts of Figure 4 which are typical of the accurate performance of the "Rototrol" show graphic proof of the results obtained on speed regulation of a single motor paper machine drive.

The "Rototrol" is essentially a small direct current generator with specially treated iron in the magnetic circuit and field windings specially connected. The brush rigging and brush connection is similar to that of the conventional direct current generator. This device differs from other rotating regulators in that no short circuited brushes, with their resultant commuta-

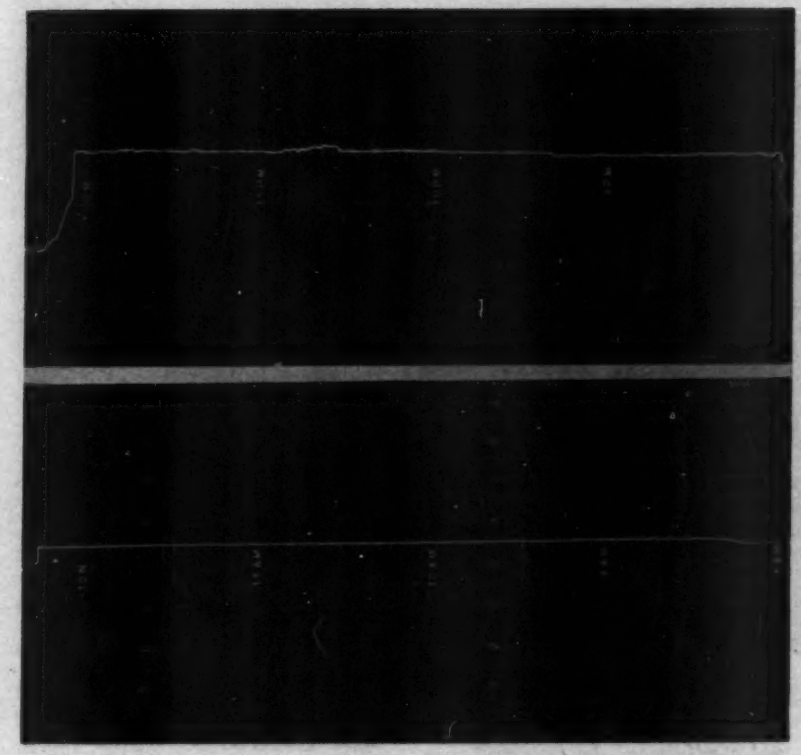


Fig. 4—Graphic charts show performance of single motor paper machine drive before regulator. Chart I (above) shows performance before installation of regulator, and Chart II (below) shows performance after installation of regulator.

tion problems are required. The "Rototrol" functions entirely through the interaction of its fields and provides the necessary amplification and sensitivity without the use and complication of supplementary amplifiers. The simplicity of the "Rototrol," which involves only the well known principles of rotating direct current machines, and its ruggedness, are such that it may be applied with confidence to paper making processes.

Multiknife Chipper Drives

The multiknife chipper using 8, 10 or 12 knives in place of the older 4-knife designs, has appeared recently. Due to the greater number of knives which results in an increased number of cuts per second, these new designs, when operated at normal knife speeds, have a peak capacity many times that of the ordinary 4-knife design. The driving motor must be designed to develop power at a rate equivalent to the maximum momentary capacity of the chipper. The synchronous motor is ideally suited for direct connected application to these chippers as it permits of high operating efficiency, power factor correction, if desired, and being direct coupled a minimum of floor space is required and maintenance of belting is eliminated.

With the synchronous motor, the flywheel effect of the chipper does little except limit the current pulsations resulting from variations in torque as the knives pass through the log. Therefore, these motors must have a pull-out torque capacity equivalent to the peak productive capacity of the multiknife design. Modification of the standard

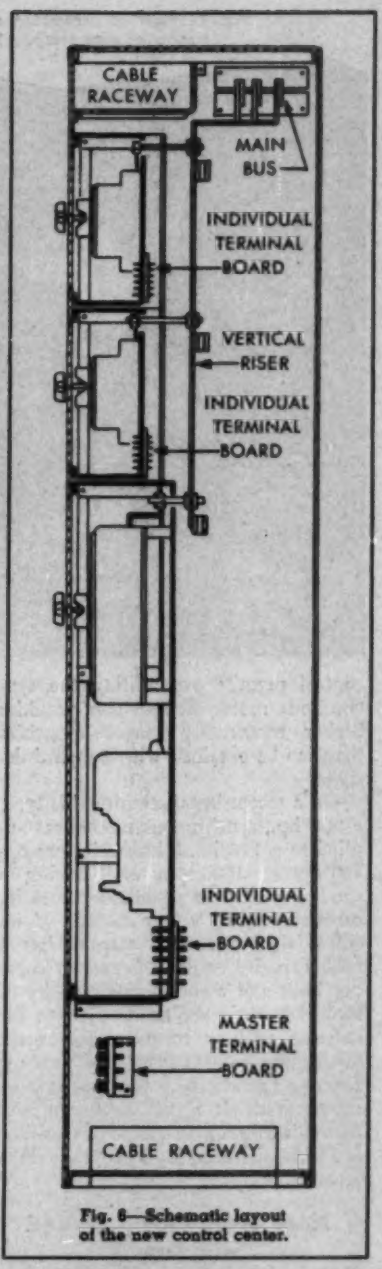


Fig. 6—Schematic layout of the new control center.

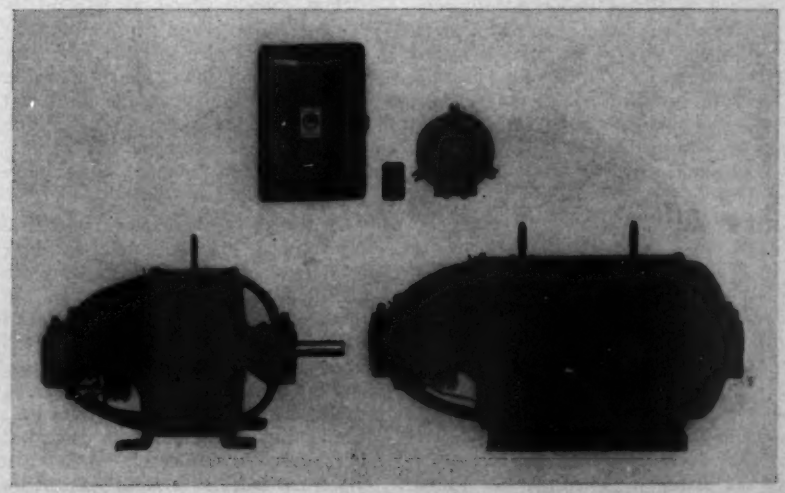
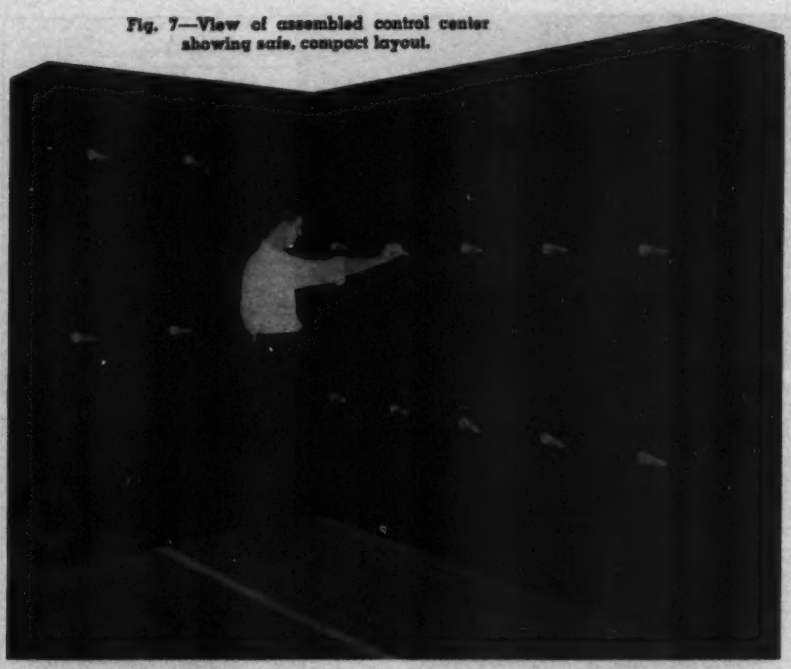


Fig. 5—Adjustable speed drive (a-c.) provides the utmost in simplicity of apparatus and control functions.

Fig. 7—View of assembled control center showing safe, compact layout.



control permits overexciting the synchronous motor field which provides higher momentary torque capacities than can be obtained with standard designs.

On a recent installation of this type, a 500 hp., synchronous motor was applied to a 110 in., 8-knife chipper operating at 240 rpm and having a spout designed to accommodate 25-in. diameter logs. When cutting ¾-in. chips, this mammoth chipper has a peak capacity equivalent to 240 cords per hour and a continuous capacity of some 80 cords per hour. Due to the extreme pull-out torque requirements of this application, provision was made for overexcitation of the synchronous motor field. It is interesting to note that this chipper is capable of chipping a 25-in. diameter log 6 ft. long in 3 seconds.

New Adjustable Speed a-c. Drive

Many of the processing machines in the pulp and paper industries such as small rewinders, shakes, and certain types of screens require a different speed for the most efficient performance of each job. In many operations highest efficiency can be obtained only if several speeds are available for different stages of the same job. Since alternating current is usually the only power available, and a-c. motors do not readily lend themselves to wide ranges of speed control, the problem of speed adjustment has been difficult.

The recently developed Westinghouse a-c. Adjustable Speed Drive is an extremely simple and reliable solution to this problem. The drive is a clever arrangement of time tested standard equipment. A unit type M-G set, consisting of a squirrel cage motor and a self-excited d-c. generator, supplies power to a standard d-c. motor. A linestarter in the a-c. circuit controlled by a "start-stop" pushbutton station, starts, stops, and protects the drive. A rheostat in the generator field circuit provides speed adjustment over a 10 to 1 speed range (1,750 rpm down to 175 rpm, for example). No exciter, exciter rheostat, clutch, or complicated control is required. The unit type M-G set and linestarter are easily mounted in any convenient location. Only one small conduit is required between the few pieces of apparatus that make up a complete drive.

The drive is available in ratings from 1 to 15 hp. inclusive for operation from any low voltage a-c. supply circuits. The drive is flexible. Many features such as reversing, inching, dynamic braking, gear motor construction and various motor enclosures can be furnished as optional features with these standard drives.

Apply Ready-to-use Control Centers

A recent development in the field of low voltage distribution is the metal enclosed motor control center. These centers consist of a framework of standard width and depth arranged to provide motor control and disconnecting elements, incoming bus structure, and convenient terminal boards and raceways for control and feeder circuits. Each individual control element consisting of a "de-ion" circuit breaker and a complete motor controller is assembled on a supporting metal base which is rigidly secured to the framework. Each combination unit is provided with a hinged cover to permit ready access for inspection and maintenance. These centers feature multiple starter trim dimensions which permits grouping various combinations of units in the standardized structure.

The structures are arranged so that any number of vertical sections can be mounted together forming a continuous enclosed structure. In such cases the incoming bus structure, as well as the cable raceways, extend throughout the full length of the assembly and risers are provided to interconnect all vertical sections. The horizontal cable raceways are interconnected with vertical raceways which permits carrying the wiring to an individual section or a master terminal board. Figure 6 shows schematically the construction of a vertical section.

The standard depth structure is arranged so that up to and including sizes 4 the rear as well as the front may be used. This arrangement permits locating double the number of control units in each individual structure. The units are connected back to back with both assemblies served by a single main incoming bus structure.

Completely factory-built and delivered to the mill location fully assembled, these control centers require only generator and feeder service and external control wiring connections. This assures proper alignment of component parts, adequate insulation and clearances, and a fully housed structure which may be readily inspected and serviced. This arrangement permits installing the complete structure in a minimum of time, with minimum costs and with a maximum saving of valuable floor space.

The control center is particularly suitable for pulp and paper mills. All of the control elements are fully protected against the adverse moisture conditions prevalent in the mills and the accessibility permits establishing the adequate inspection and maintenance schedule essential to uninterrupted service.

A review of these recent electrical developments may indicate cases where productive efficiency and economy can be improved by their utilization. In many cases, minor modifications of existing installations by newly developed devices will increase production and lower maintenance. In other cases, replacements of the older drives by a simple and efficient modern drive will boost output considerably. As in past years, the industry is rapidly absorbing all new engineering ideas that pay their way.

AUTOMATIC WEIGHING
of Digester Chip Loadings

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▸▸▸ BROWN STOCK OF UNIFORM QUALITY is a much-sought-after condition in modern pulp mills, especially in those plants turning out a bleached product.

Unbleached pulp having a constant chlorine number insures maximum strength properties in addition to smooth and economical operation of the bleach plant.

Because of governmental restrictions on chlorine available to non-defense industries, the economical use of this chemical is more important than it ever has been before.

In order to produce uniform pulp in the digesters, a definite ratio of active alkali to wood must exist at all times. This condition only can be brought about if some accurate way is utilized to (1) Weigh the total tons of chips charged; (2) Measure the amount of alkali and water or black liquor make-up charged.

The first of these requirements can be accomplished by using a series of wide rubber belts in conjunction with an automatic weighing device.

The alkali can be measured accurately by titrating the white liquor to be used and then pumping it into a calibrated tank equipped with a level indicator. A separate calibrated tank equipped with a level indicator can be used for the water or black liquor make-up.

In mills where there is no segregation of the wood, but highland wood and lowland wood is all run in together, weighing the chips as the digester is being loaded is of the utmost importance. The following tabulation shows the difference slight moisture variations make in the amount of chips needed to be charged to give a definite bone-dry weight.

Dry Wood Charge 21½ Tons

Moisture in Wood	*Net Wt. Chips (tons)*
47	40.56
48	41.35
49	42.16
50	43.00
51	43.88
52	44.79
53	45.74

Normally, digesters are loaded by filling them with as many chips as they will hold. Since pinewood varies anywhere from 47-53 per cent in moisture, it means that the actual tons of chips in a full digester will run from 40.56 tons to 45.74 tons—a difference of 5.18 tons. This extra moisture in the charge will raise the chlorine number considerably—a point that at present is very vital.

A 1 per cent variation in chip moisture in actual plant practice was found to have the following effect:

Cl_2 No. (52% Moisture)	*Cl_2 No. (51% Moisture)*
8.4	7.6
8.4	7.6
8.2	7.5
8.2	7.5
8.5	7.6
8.5	7.6

Since the difference between 52 and 51 per cent moisture on a 21.5 ton bone-dry charge is approximately 0.9 ton, it can be assumed that this amount of moisture made a difference of .8 of a point in the chlorine number. By a careful moisture determination and an accurate weight of chips charged, this undue rise in chlorine consumption could have been avoided.

Packing chips in a digester, especially in one using indirect steam, tends to hinder circulation, and pulp that is not uniform is produced.

Chip Loading

One modern mill using a continuous weighing scale successfully in loading digesters has the following setup.

The chip storage bin is located approximately 60 yards from the digester building. Directly under the bin and running the entire length of it, is a 3-foot rubber belt.

At regular intervals of 8 feet at the base of the chip bin are mechanical feeders that insure a steady flow of chips from the bin to the conveyor belt. In all, there are twelve such feeders. The number running at any one time depends on the position of the chips in the bin and the speed desired to load the digester.

On the top floor of the digester room and approximately 65 feet from the ground is another rubber conveyor belt that runs the entire length of the digester floor and is about 12 feet

Fig. 1—Movable discharge carriage on conveyors over digesters.

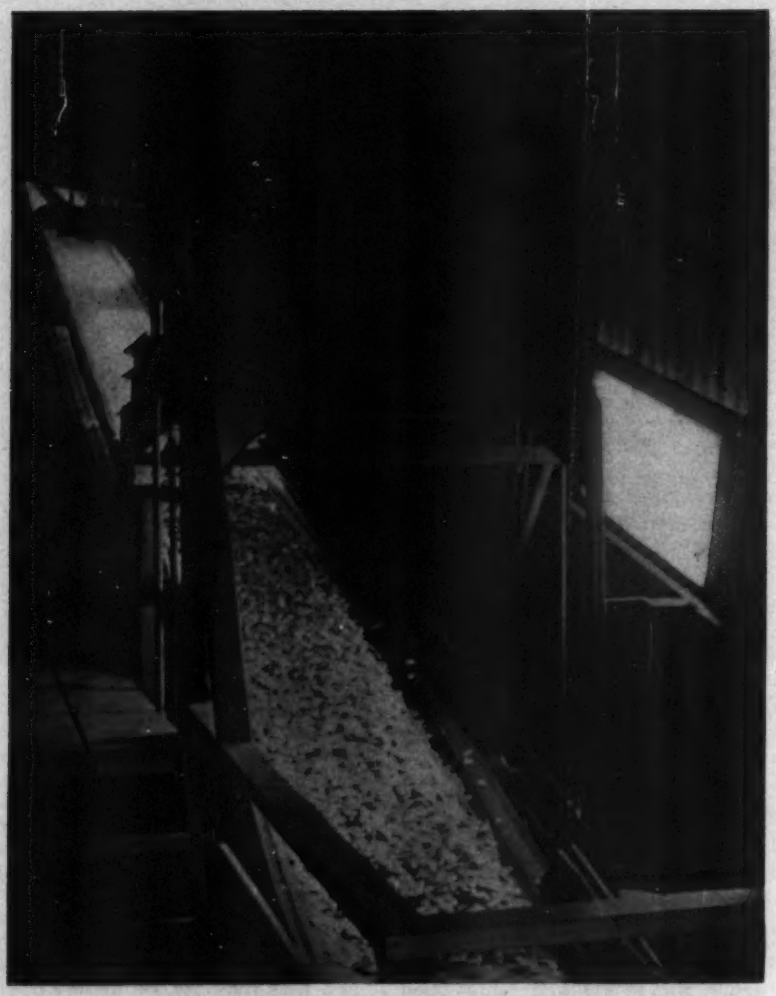


Fig. 2—Weighing device installation.

above the top of the digesters. Hooked up on this belt as an integral part of it is a movable carriage that runs on a set of tracks and which can be moved at will by the motion of the belt and a series of pulleys. This carriage is equipped with a large steel hopper that can be placed over the digester to be loaded (Figure 1).

The connecting link between the chip bin and the digester floor is another rubber conveyor belt approximately 190 feet long. Because of the height to which the chips must be carried, this belt makes an angle of approximately 20 degrees with the horizontal.

It is on this long rising belt that the automatic weighing device is located. This instrument is basically a set of balances that automatically weighs the chips as they pass over it. The key part of this device is an integrator disc that is intricately balanced in a vertical position. A system of compound levers runs from this disc to the bottom of the conveyor belt. As the chips pass over the device the added weight causes the belt to sag. This works the compound levers, which in turn throw the integrator disc off its vertical position. The heavier the load, the more the integrator disc deviates from its vertical position. The greater the deviation from its normal position, the faster the integrator disc turns. Hooked up to the disc is a set of small gears that works similar to an automobile speedometer and the total amount of chips is recorded as they pass.

On the operating floor of the digester room is a switchboard containing the controls for the feeders in the chip bin. The control switches for all the conveyor belts are on this same board.

The electrical setup is such that (Figure 3) belt *C* must be running before either *A* or *B* may be started. Belt *B* may run without *A*, but in order to start belt *A*, both *B* and *C* must be started first.

This setup prevents any pile-up of chips in case of electrical trouble and if an emergency should arise, simply by stopping conveyor *C*, both *B* and *A* are automatically cut off.

On the operating floor of the digester room is a small counter that is electrically connected to the continuous weighing scale. The outside of this instrument closely resembles an automobile cyclometer and the numbers range from .1 to 1000. By a simple manipulation, the operator can set the counter on any number he desires within the range of .1 ton to 1000 tons. When that number of chips has entered the digester, the conveyor belt under the chip bin is automatically stopped, thus ending the flow of chips.

Since the amount of bone-dry wood charged in the digester is the controlling factor, a moisture content must be run on the chips. The chip moisture varies little from one digester loading to another, the sample for the moisture determination being caught from the previous digester loaded. The moisture in pine varies with the limits of 42-53 per cent and on gumwood from 45-48 per cent.

The method employed for a chip moisture determination is from TAPPI Standards (T3M-34) with the following exceptions:

1) No $CaCl_2$ tube is used.

2) For purposes of economy, moisture free kerosene is used in place of toluene.

3) The moisture trap is constructed so as to have markings from 40-55. This allows the per cent moisture to be read off directly.

4) A 100 gram sample is taken.

In loading a digester with chips, the following operations are carried out:

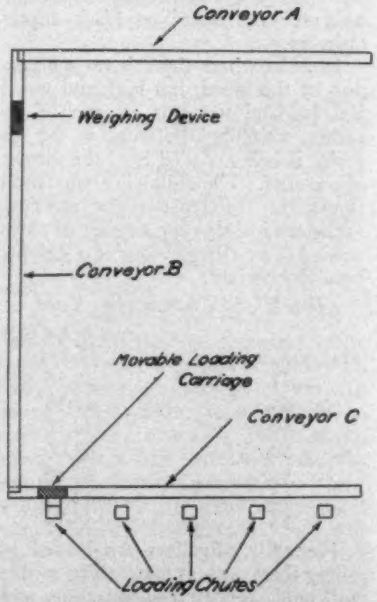


Fig. 3—Sketch, chip conveyors to digesters.

Fig. 4—Chip bin bottom showing discharge openings and receiving conveyor in system for digester delivery.

1) Run a chip moisture on chips from previous loading.

2) Set movable carriage over digester to be loaded.

3) Start all conveyor belts.

4) Turn on enough feeders to give the desired flow of chips.

With the above operations completed, the operator can forget about the chips and devote his time to other duties.

When the amount of chips set on the counter has been loaded, the weighing device will automatically stop the belt under the chip bin thus ending the flow of chips. When the other two belts are empty, the movable carriage is placed over the next digester to be loaded and the entire operation is repeated.

Four tons of chips per minute can be easily handled by this system and a 3,400 cu. ft. digester holding approximately 44 tons of chips can be loaded in 11 minutes.

Alkali Measurement

A minimum of two measuring tanks is needed for accurate alkali measurement. One is used for cooking liquor —the other for make-up black liquor or water. Both tanks are connected at the bottom to a common header with individual valves on each. A 1,200 gpm pump transfers the liquor from the measuring tanks to the digesters.

Each tank is equipped with an air-flow liquid level gauge. This method of measuring is based on the principle of running a ½-in. pipe in the tank to a known distance from the bottom. The amount of air pressure needed to counterbalance the liquid head at that point is a direct function of the level in the tank.

This system provides means of purging the tank liquid out of the piping system by means of a constant slow flow of air which bubbles out of the ½-in. pipe riser in the tank. The bubbles are released at the reference level (the minimum level which can be registered by this system) and the back pressure on the air in the system is equal to the liquid head at that point. This pressure is conveyed to the gauge and registers on it in terms of liquid level.

Each recording meter is equipped with two sets of movable pointers—upper and lower. The first marker is set on the feet of liquor needed in the tanks to give the desired charge. The lower pointer is set at zero at all times.

As the tank is being filled the level indicating pin comes in contact with the upper pointer; electrical contact is made and a switch is closed which automatically cuts off the pump filling the measuring tank.

When the measuring tank is being pulled empty, the level indicating pin will slowly drop downward. When the tank is empty the pin will make contact with the bottom pointer on the level gauge and this will cut off the pump loading the digester.

The cooking liquor consists essentially of Na_2CO_3, Na_2S, and NaOH. Of these three chemicals only the last two are active as pulping agents. In running an analysis on each charge of cooking liquor, the carbonate is precipitated out with $BaCl_2$ before titrating with acid.

Liquor Analysis

1) Obtain representative sample from pump transferring liquor from caustic house to measuring tank.

2) To a 250 cc. graduated flask add 20 cc. of saturated $BaCl_2$ solution, 20 cc. sample and fill to mark with water.

3) Let flocculent precipitate settle until solution is clear.

4) Take 25 cc. aliquot of clear liquor, add a few drops of methyl orange indicator and titrate with .773N HCl (10 cc. = 1 lb./gal. Na_2O).

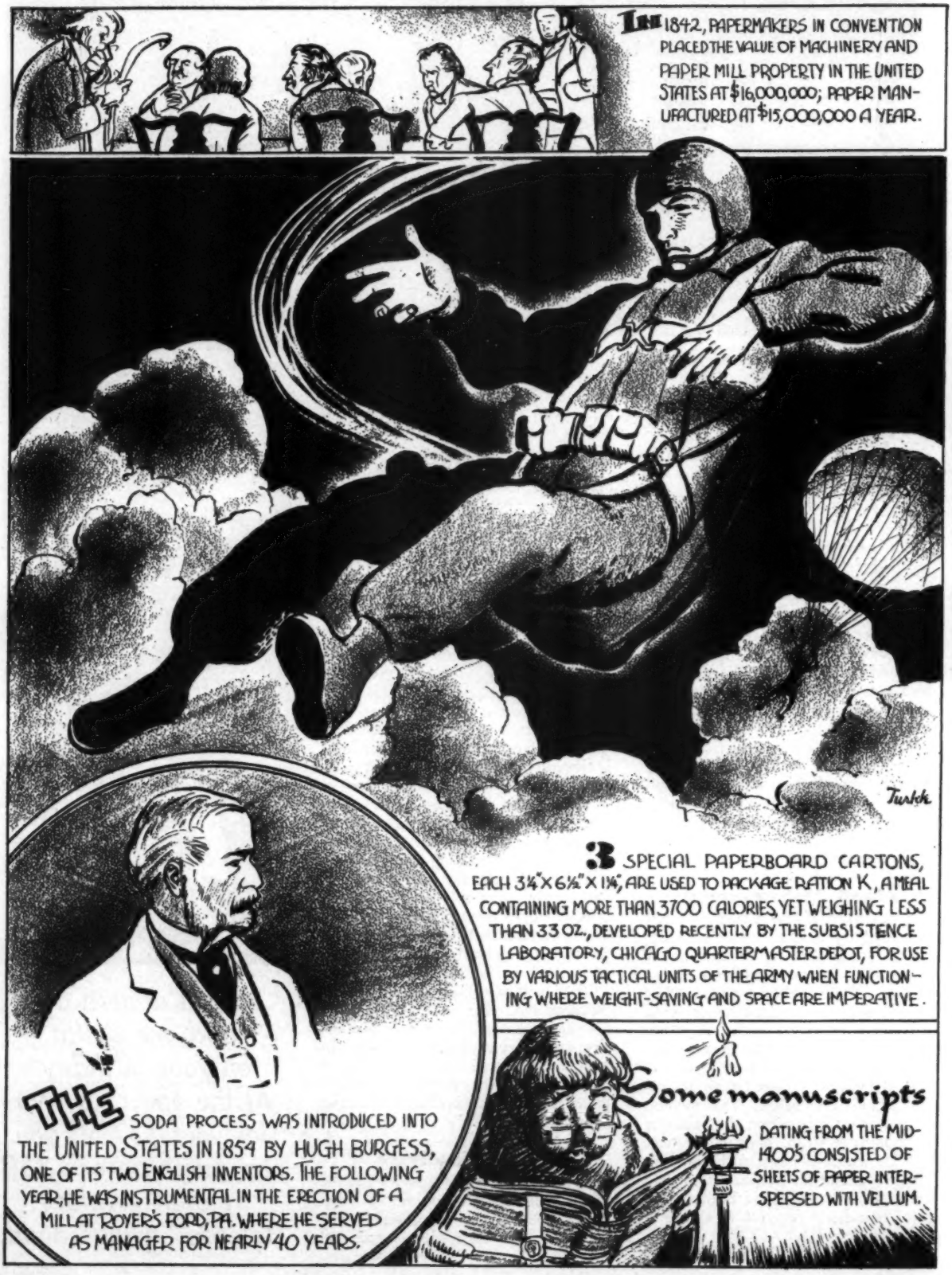
5) $\frac{\text{Titration}}{10}$ = lb./gal. active Na_2O in cooking liquor.

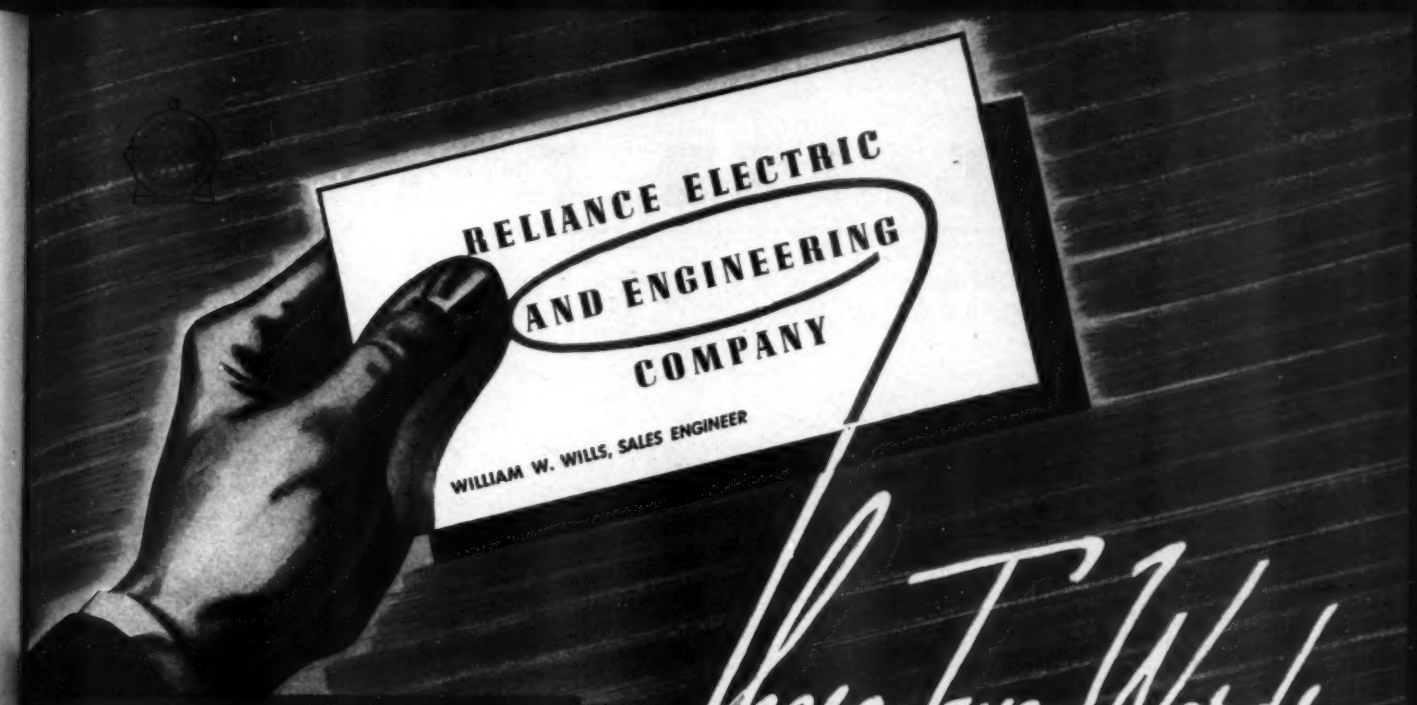
By simply dividing the total amount of Na_2O desired charged by the concentration of the cooking liquor, the operator can find the total gallons of chemical required. By referring to a calibration chart for the measuring tank, the number of feet of liquor needed is easily determined. This done, the upper pointer on the level gauge is set at that height and no more attention need be paid to that part of the operations until a digester is ready for loading.

This method of loading digesters is very easy and as fool-proof as any operations can be. A definite alkali to wood ratio can be maintained at all times and henceforth uniform pulp can be expected as a product.

Save a dime a day and one dollar on your birthday. At the end of a year for your $37.50 you can purchase one $50 (maturity value) Defense Savings Bond.

PAPER SKETCHES


IN 1842, PAPERMAKERS IN CONVENTION PLACED THE VALUE OF MACHINERY AND PAPER MILL PROPERTY IN THE UNITED STATES AT $16,000,000; PAPER MANUFACTURED AT $15,000,000 A YEAR.
Turtch
3 SPECIAL PAPERBOARD CARTONS, EACH 3¼"X6½"X1¼", ARE USED TO PACKAGE RATION K, A MEAL CONTAINING MORE THAN 3700 CALORIES, YET WEIGHING LESS THAN 33 OZ., DEVELOPED RECENTLY BY THE SUBSISTENCE LABORATORY, CHICAGO QUARTERMASTER DEPOT, FOR USE BY VARIOUS TACTICAL UNITS OF THE ARMY WHEN FUNCTIONING WHERE WEIGHT-SAVING AND SPACE ARE IMPERATIVE.
THE SODA PROCESS WAS INTRODUCED INTO THE UNITED STATES IN 1859 BY HUGH BURGESS, ONE OF ITS TWO ENGLISH INVENTORS. THE FOLLOWING YEAR, HE WAS INSTRUMENTAL IN THE ERECTION OF A MILL AT ROYER'S FORD, PA. WHERE HE SERVED AS MANAGER FOR NEARLY 40 YEARS.
Some manuscripts DATING FROM THE MID-1400'S CONSISTED OF SHEETS OF PAPER INTERSPERSED WITH VELLUM.



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The man who sends this Reliance card to you is skilled in Application Engineering. He is prepared to discuss motor-drive as a means for boosting production and improving the quality of the products made in your plant. He represents an organization whose "bread and butter" for 35 years has come from showing industry how electric motors can be used profitably to do *many things* besides turn shafts and gears. To get the most from these production aids call in a Reliance man when your plans are in the early stages. He can help make motor-drive an integral part of your production equipment and not an appendage. No obligation, of course.

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MATHIESON MARKS 50TH ANNIVERSARY

Fifty years ago, the Mathieson Alkali Works, Inc., received its charter in "Old Virginia." At that time, all of the bleaching powder and most of the alkali consumed in this country were imported from England, and imported products were strongly favored over domestic. In view of this condition, and in order to secure a product equal to that imported, the construction of the Mathieson plant and its operation were entrusted to a retired English alkali manufacturer, Neil Mathieson. He sent his son, Thomas T. Mathieson, to this country, and under the latter's supervision, a plant was built at Saltville, Virginia, where there are huge and historic salt deposits.

The company's next step was to obtain control in this country of the Castner electrolytic cell for the manufacture of extremely pure caustic soda and chlorine, and to obtain cheap power, a plant was built at Niagara Falls, New York. This plant went into production late in 1896.

In addition to the two plants mentioned, the company now has a plant at Lake Charles, Louisiana, and is one of the major producers of alkalies, chlorine, synthetic ammonia and numerous other products. At present, these plants are turning out maximum production to supply chemicals vitally necessary to our "all-out" war effort.

◆

▶▶▶ THE DEVELOPMENT AND RESEARCH DIVISION of the International Nickel Company in Detroit, Michigan, announces that its offices have been moved from Room 10-227, to the eighth floor, Room 8-217 of the same building. This change was brought about due to increased defense activities.

◆

GOODRICH EXPANDS PLAN TO CONSERVE

The conservation program started last year by the B. F. Goodrich Company, Akron, Ohio, has resulted in a saving at a rate of more than 1,000,000 pounds of box, fiber, and corrugated board per year used in shipping products according to a report from the National Conservation Advisory Committee.

Besides the conservation of various types of packing board, this company has inaugurated an intensive campaign in all of its factories to prevent waste and to salvage all usable materials including scrap rubber, metals of all kinds, waste paper, rags, cans, shipping containers, and boxes.

Another step is being taken by urging that discarded and worn-out tires and tubes be brought to company tire stores. Although this material has no value except as scrap, it is pointed out that it will be a contribution to the nation's vital rubber supply.

◆

▶▶▶ THREE MORE MANUFACTURING PLANTS doing outstanding defense work have been awarded the Navy Ordnance Flag and "E" Pennant (cf. THE PAPER INDUSTRY AND PAPER WORLD, January, 1942, p. 1008). The latest recipients of this honor are the South Bend Lathe Works, South Bend, Indiana; the Monsanto Chemical Company, St. Louis, Missouri; and the Kropp Forge Company, Chicago. These awards were made because of the excellent job that these companies are doing in fulfilling their duties as a unit of the Defense Program.

◆

BARTLETT HAYWARD RECORDS HISTORY FROM BEGINNING

It is often said that hundreds of interesting stories have never been written. If all businesses would give to the world the stories of their beginning and development, what a library it would make.

The Bartlett Hayward Division of The Koppers Company, Baltimore, has just published a book entitled *Iron Men and Their Dogs*, by Ferdinand C. Latrobe. The book contains 225 pages with a stiff board cover. It is the story of the progress and growth of "Bartlett Hayward" from the early days of the company when it made stoves down to the present day of its many and in many cases ornamental products. As stated in the Preface "All its progress has been made under the talisman of two cast-iron replicas of the primogenitors of the Chesapeake Bay Dog." The cover bears a reproduction of the entrance to the company's offices with the iron dogs keeping watch—one on each side.

The history recorded in the text of this book would make it worth reading many times, but the book is artfully illustrated. This company has indeed left a narration of its accomplishments that will be read and enjoyed by generations to come.

▶▶▶ THE DEFENSE STAMP SALES PROGRAM is being aided in a novel way by E. C. Atkins and Company, Indianapolis, Indiana. One cover of this company's latest bulletin giving the list prices and specifications of its products is devoted to a reproduction of the large government poster encouraging the purchase of Defense Stamps. It is reported that this bulletin reaches thousands in the industry.

◆

CONTEST RULES SET UP BY THE LINCOLN FOUND.

The procedure for handling the papers on War subjects for submission to The James F. Lincoln Arc Welding Foundation in the $200,000 Industrial Progress Award Program has been announced by officials. This contest will be confined to papers concerned with War equipment, listed under 46 divisions of participation.

The five-point procedure, as outlined by the Foundation, states that: (1) the proposed subject must be approved by the employer, if the subject matter involves work done by him and then must be submitted to the proper bureau of the Navy or Army by the local inspector for official approval; (2) after approval of the subject the paper should be prepared; (3) information which might aid the enemy should be avoided; (4) the paper should be submitted to the proper department of Navy or Army for official approval of the contents; and (5) the paper should be presented following the requirements of the Foundation governing papers.

The contest offers 458 awards ranging from $100 to $13,700 for papers describing advances and improvements resulting from the application of arc welding to design, manufacture, fabrication, construction, welding service or maintenance of any type of machine, building, product or structure, etc.

◆

WESTINGHOUSE ENGINEERING PROGRESS IN '41

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, has just released the 1941 edition of *Engineering Progress*. One has only to glance through this excellent review of the year's development to realize what progress is being made by science and industry.

The pages of this very well written and profusely illustrated book lead one from the very newest electrical equipment and devices that are being placed in industrial plants to the latest appli-

ances, lighting and electrical effects for general business houses and the home. So many of these new things will become a vital part of our modern way of life, and this book is a complete preview of what we may enjoy tomorrow.

◆

▸▸▸ A NEW, COMPLETE LINE of "blackout and camouflage" paints for emergency war needs has been announced by the paint division of the Pittsburgh Plate Glass Company, Pittsburgh. These paints have been developed in four principal colors: black, smoke gray, earth drab, and neutral brick. It is suggested that by using the color which most nearly blends with the surroundings, a partial camouflage is effected in the daytime, in addition to blackout protection during the night.

◆

MAGNESIUM PLANT TO USE PEERLESS PUMP DIV. PLAN

The main source of water supply for the new 63 million dollar basic magnesium reduction plant near Boulder City, Nevada, will be provided by an engineering plan originated by the Peerless Pump Division of the Food Machinery Corporation, Los Angeles, California. This plan involves the novel design of 6 high capacity deep-well turbine pumps, each pump to be mounted on steel piers extending 200 feet out into Lake Mead and capable of delivering 3,800 gallons of water per minute—or a combined potential capacity of 32 million gallons daily.

This new reduction plant, Basic Magnesium, Inc., will have the capacity of 112 million pounds of vital metallic magnesium a year. This metal will be used in the manufacturing of airplanes, ships, and other weapons. The present plan is that the ore will be mined at Gabbs and Mead, Nevada, and will be shipped 200 miles to the reduction plant.

◆

A NEW PROCESS

A simple process by which it is claimed any wood pulp paper may be treated to make it instantly moisture-proof, opaque, and at least 40 per cent stronger is causing interest in the paper industry. A cold-cut solution of Vanadiset Plastic Resin 30 per cent and coal tar naphtha 70 per cent is used. Complete impregnation is instantaneous and the drying time is short. In some cases drying is speeded up by electrical heat.

This is the same principle followed in the interesting use of Vanadiset Resin as a wood dye and preservative.

Here's One Way to Reduce Costly Accidents

Are costly accidents plaguing your mill—accidents arising through the manual handling of paper? If they are, here's the quick, sure way to end this menace.

A Mercury Center Control Tilting Tiering Fork Truck will give you safe, fast, economical handling of all your paper—whether it's in rolls, packages or sheets. Give you full utilization of all available storage space by stacking to the rafters.

The Center Control feature affords clear visibility and full protection to the operator—the Hydraulic Lift (pioneered and perfected by Mercury) gives more efficient, more economical handling.

Learn how Mercury Material Handling Equipment is helping other mills to safer, faster, more economical handling. Write for Bulletin 210.

Mercury Pioneered and Perfected These Lift Truck Improvements:
Hydraulic Lift
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Annual Meeting of Canadian Technical Section

▶▶▶ THE TWENTY-EIGHTH annual meeting of the Technical Section of the Canadian Pulp and Paper Association, held in Montreal January 28 to 30, established a new high in attendance records for both members and guests. In keeping with wartime conditions, frills were eliminated and members were engaged almost continuously in serious discussion of technical matters. Of the three days occupied by the meeting, a day and a half was devoted to papers and the remainder of the time to group discussions. Program arrangements new to the Technical Section contributed to more efficient utilization of the time available. In the past, all formal papers have been presented before full meetings, but on this occasion two sessions were held simultaneously, one concerned mainly with groundwood and newsprint paper and the other more directly with chemical pulps. Other matters which ordinarily occupy part of the time of the chemical sessions were dealt with at a business luncheon or in group meetings sponsored by the various standing committees.

Papers of outstanding interest were presented by: Dr. D. B. Judd, research physicist, National Bureau of Standards, "Colorimetry of Pulp and Paper with Special Reference to Brightness and Whiteness;" and by W. E. Wines, manager of the Mechanical Department, American Newspaper Publishers' Association, "A Newspaper Man Looks at Newsprint." Other papers included: "Mechanical Developments in Pulp Bleaching," by Viggo Ullman, now Lieut. Ullman of the Royal Norwegian Air Force; "Slime Control in a Modern Newsprint Mill," by N. S. Grant, Great Lakes Paper Company, Ltd.; "A Stock Preparation System," by F. S. MacDonald of J. R. Booth Ltd.; "Controlling Manufacturing Costs," by A. F. Gurr, Consolidated Paper Corporation Ltd.; "Studies in Classification and Refining of Groundwood Pulp," by J. D. Brown, of the Canadian International Paper Company; "Groundwood at 5,400 Surface Feet per Minute," by J. B. Jones and W. W. Holland of the Ontario Paper Co. Ltd. and the Quebec North Shore Paper Company; "Rapid Determination of Freeness in the Grinder Room," by E. Cowan of Lake St. John Power and Paper Company Ltd.; and "Waste in Pulp Manufacture," by W. H. Birchard of Fraser Companies Ltd. Short studies were also presented by the Groundwood Committee and by the Engineering Committee.

An exhibition of war-time products of the machine shops of Canadian pulp and paper mills attracted wide attention. Featured were both jigs and dies for use in ordnance factories, and fittings for cargo vessels and light naval craft which are under construction in Canadian yards. E. W. Harvey, co-ordinator of the C. P. P. A. War-time Machine Shop Board, explained how the paper industry had been brought into direct war production to widen bottlenecks caused by shortages of machine tools and how staffs were built up and trained so as to place the maintenance shops of the industry on a twenty-four hour basis.

Following a precedent established three years ago, problems submitted by pulp and paper mills were discussed informally in closed meetings under the leadership of the chairmen of the standing committees. Groups which were active, with their chairmen, were as follows: *Heat and Power*, F. S. MacDonald of J. R. Booth Ltd.; *Groundwood*, J. D. Brown of Canadian International Paper Ltd.; *Education*, J. N. Stephenson, *Pulp and Paper Magazine of Canada; Engineering*, F. W. Bradshaw, Consolidated Paper Corporation; *Fine Papers*, E. R. Wand, Interlake Tissue Mills; *Newsprint*, G. A. Sutton, St. Lawrence Paper Mills; *Kraft*, A. J. Phillip, Canada Paper Company; *Physical and Chemical Standards*, G. Larocque, *New York News; Waste*, W. H. Birchard, Fraser Companies; *Board*, F. F. Arnoldi, Hinde and Dauch Paper Company of Canada Ltd.; *Sulphite*, F. X. Guimond, Canadian International Paper Company; and *Wood Chemistry*, A. C. Hill, Anglo-Canadian Pulp and Paper Mills Ltd. Some hundreds of specific questions were handled by these various groups.

E. D. Kyndman, general superintendent, Anglo-Canadian Pulp and Paper Mills Ltd., takes over the chairmanship of the Technical Section. At the left is W. B. Scott, retiring chairman; at right is Doug. Jones, secretary-engineer of the Canadian Association.

PRODUCTION *in full Gear...*

WE SERVE YOU with a plant, a product, and a personnel. But we also serve you with assets equally important — the largest plant in the world devoted exclusively to the manufacture of mechanical rubber goods. The plant consists of 23 separate buildings covering 15 acres of floor space, with the most complete modern equipment, some of which is duplicated nowhere else, and with its own brass foundry and power house.

The product is built to unswerving standards in material and workmanship, and has long maintained an enviable reputation.

In addition to the repeated contributions to the rubber industry in epoch-making inventions and improvements, we pledge a steadfast resolution to continue to deserve the confidence which for more than 60 years you have placed in us.

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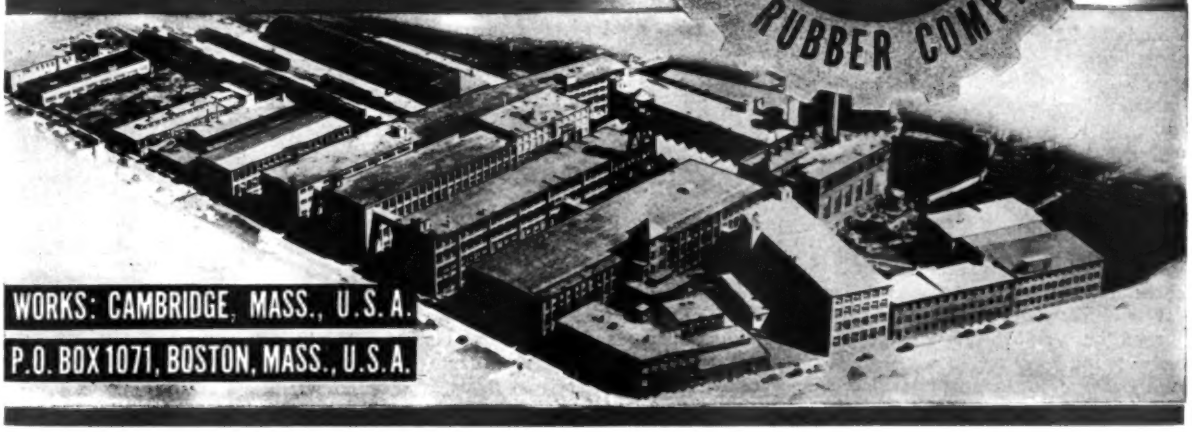


WORKS: CAMBRIDGE, MASS., U.S.A.

P.O. BOX 1071, BOSTON, MASS., U.S.A.

Left—R. L. Weldon presents the Howard Smith Medal to K. D. Running of the Anglo-Canadian Pulp and Paper Mills Ltd. Right—Carl Jentz, Jr., receives the I. H. Weldon Medal from the hands of the donor, A. L. Dawe.

A business luncheon on January 28 was the only function held by the Technical Section. At this gathering E. D. Hyndman, general superintendent of the Anglo-Canadian Pulp and Paper Mills Ltd., was elected chairman of the section for 1942. G. E. Shipman of Donnacona Paper Co. Ltd., and D. E. Read of International Fibre Board Ltd., were elected Councillors. The retiring chairman, W. B. Scott of Consolidated Paper Corporation, Ltd., presented the annual report of the section and F. G. Robinson, president of the Canadian Pulp and Paper Association, addressed the members briefly. The I. H. Weldon medal was presented by the donor, A. L. Dawe, to Carl Jentz, Jr., for his papers on the production of sulphur dioxide by the flash roasting of pyrites. K. D. Running was awarded the Howard Smith medal for papers on the utilization of hardwoods. Mr. Robinson announced that he would donate a new medal to be awarded annually under conditions to be determined by the Council of the Technical Section.

The annual meeting of the Woodlands Section was held simultaneously with that of the Technical Section. A Study of Pulpwood Skidding Technique, being made under the direction of A. Koroleff, Director of Woodlands Research, Pulp and Paper Research Institute of Canada, was described in some detail. Group discussions were held on a number of other topics including Land Transportation, Water Transportation, Hygiene and Accident Prevention, Forest Conservation, and Woods Supplies and Purchasing. A luncheon meeting was addressed by Lieut.-Col. Howard Kennedy, who held office in the Woodlands Section before the war and who has now returned from overseas to an appointment on the Canadian General Staff. W. G. Wright, of Price Bros. and Company Ltd., was elected chairman, succeeding L. A. Nix of the Bathurst Power and Paper Company. J. V. Perrin of the Brown Corporation was elected vice chairman.

Both Technical and Woodlands sections joined in the Canadian Pulp and Paper Association Luncheon, which takes the place of the dinner held in former years. More than nine hundred persons greeted the newly-elected president of the Association, R. L. Weldon, president of the Bathurst Power and Paper Company, and heard the report of the retiring president, F. G. Robinson. In the course of his report, Mr. Robinson pointed out that during the past year the pulp and paper industry of Canada has maintained its position as a foremost industrial producer and has reached an output of nearly ten million tons valued at about four hundred million dollars.

◆

TAPPI & SUPTS. MEET JOINTLY AT KALAMAZOO

More than 400 leaders of the pulp and paper industry attended the seventh annual joint meeting of the Kalamazoo Valley section of the Technical Association of the Pulp and Paper Industry, and the Michigan division of the American Pulp and Paper Mill Superintendents Association, in the Park-American Hotel in Kalamazoo January 15.

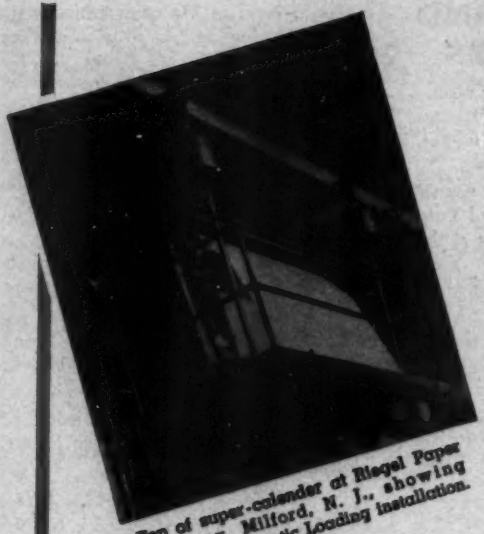
E. W. Tinker, executive secretary of the American Paper and Pulp Association, New York, told guests in the evening's principal address that the big contribution this industry can make toward winning the war is to move as smoothly as possible, filling military needs first, essential civilian needs second, and by striving to man jobs.

Sharp curtailment of production in 1942 can be expected, Tinker warned. If the industry appreciates and studies the different moves from day to day and the trends as the war machine develops, we can survive with a minimum of shock. He also said that the industry can help protect itself by assuming a major position in the industrial scene today.

Mr. Tinker termed "ill timed" the talk of shortages in some paper supplies. There is no doubt that shortages exist in certain grades, he said, adding that unwise publicity was resulting in "a degree of speculation." He added that price ceilings would take the profit motive out of the industry during the war, and that papermakers can look forward to tariff revisions, notably with Canada, as a measure to alleviate wartime shortages.

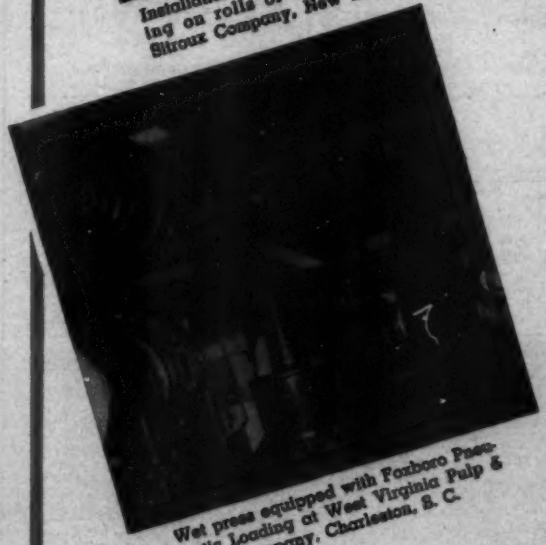
Henry Nendorf, Rex Paper Company, chairman of the Superintendents Association, and Fred L. Chappell, Jr., Sutherland Paper Company, chairman of TAPPI, presided at the joint meeting. George Gerpheide, president of the Hawthorne Paper Company, was toastmaster.

Guests included: D. Clarke Everest, president and general manager of the Marathon Paper Company, Rothschild, Wisconsin; Oscar Stamets, Riegel Paper Corporation, national president of the Superintendents Association; W. H. Swanson, Kimberly-Clark Paper Corporation, Neenah, Wisconsin, national president of TAPPI; Ralph Hayward, president of the Kalamazoo Vegetable Parchment Company, national TAPPI vice president; Robert L. Eminger, Miamisburg, Ohio, national secretary of the Superintendents Asso-



Top of super-calender at Riegel Paper Company, Milford, N. J., showing Foxboro Pneumatic Loading installation.

Installation of Foxboro Pneumatic Loading on rolls of Yankee machine at Sitroux Company, New Hartford, N. Y.



Wet press equipped with Foxboro Pneumatic Loading at West Virginia Pulp & Paper Company, Charleston, S. C.

EVERY WEEK...

Another Mill switches to Foxboro Pneumatic Loading!

Here's the best evidence you could have that pulp and paper mills are getting results from Foxboro instrumentation. Over 300 mills have installed Foxboro Pneumatic Loading . . . and *others* are adopting it at the rate of *one a week!*

Foxboro Pneumatic Loading is a typical example of Foxboro Creative Instrumentation . . . original engineering that applies instruments to make processes work better. On press rolls, calenders and other roll equipment, this improved loading system maintains exact calibrated pressure on each end of the roll independently. Operating automatically, Foxboro Pneumatic Loading stops bouncing of rolls and eliminates across-the-roll variations.

Write for Bulletin 217-1. List of users in your vicinity supplied on request. The Foxboro Company, 158 Neponset Ave., Foxboro, Mass., U.S.A. Branches in principal cities of United States and Canada.

FOXBORO

Reg. U. S. Pat. Off.

Creative Instrumentation

Simple adjustment of two knobs on this instrument applies exact calibrated pressure to roll-ends. Pressures continuously recorded. Instant-release valve center.

ciation; R. G. Macdonald, New York, national secretary-treasurer of TAPPI; Grover Keeth, Marathon Paper Company, national vice president of the Superintendents Association.

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▶▶▶ THE AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION announces that the 23rd annual convention is scheduled for June 16-18, 1942, in Grand Rapids, Michigan. The convention will be built around papers and discussions of general topics and problems which face the industry. There will be no exhibit this year.

◆

SUPTS. ASKED TO BREAKFAST MEET BY PRES. STAMETS

The members of the Board of Trustees of the American Pulp and Paper Mill Superintendents' Association who may be in New York City to attend the annual meetings of the American Paper and Pulp Association, Technical Association, and other groups, February 16 to 19, are invited to attend a breakfast meeting to be given by President Oscar Stamets of the Superintendents' Association, February 18 at the Commodore Hotel.

The purpose of the meeting is to discuss business and plans for the Association's 23rd annual convention scheduled for June 16 to 18, 1942, in the Pantlind Hotel, Grand Rapids, Michigan. Past presidents and present local division chairmen of the Association are also invited to attend the breakfast.

◆

EMPIRE STATE TAPPI MEETS AT WATERTOWN

The midwinter session of the Empire State Section of TAPPI was held at the Hotel Woodruff, Watertown, New York, January 10. F. C. Goodwill, technical director of the St. Regis Paper Company, presided and 30 chemists and technical men from pulp and paper mills in northern and central New York attended.

Dr. William Stericker, who is associated with the Philadelphia Quartz Company, Philadelphia, presented a paper on "The Use of Silicates in Bleaching." Chace Mather, chief chemist of the St. Regis Paper Company, gave a paper on "Paper Mill Losses," and W. E. Moran of the National Aluminate Company, Chicago, told of a new product which increases strength of paper and produces other qualities.

CONVENTIONS AND COMING EVENTS

Feb. 16-19—Annual meeting of the Technical Association of the Pulp and Paper Industry, Commodore Hotel, New York City.

Feb. 16-19—"Paper Week" annual meetings of American Paper and Pulp Association and affiliated bodies at the Waldorf-Astoria Hotel, New York City.

March 3—Dinner meeting of the Pacific Coast Section of the Technical Association of the Pulp and Paper Industry at Portland, Ore.

April 7—Dinner meeting of the Pacific Coast Section of the Technical Association of the Pulp and Paper Industry at Port Angeles, Wash.

May 5—Tentative dinner meeting of the Pacific Coast Section of the Technical Association of the Pulp and Paper Industry at Vancouver, B. C.

June 16-18—Twenty-third Annual Meeting of the American Pulp and Paper Mill Superintendents Association, Grand Rapids, Michigan.

Sept.—Twentieth Annual Conference of the National Industrial Advertisers Association at the Hotel Traymore, Atlantic City, New Jersey.

Oct. 5-9—The Thirty-first National Safety Congress and Exposition at the Stevens Hotel, Chicago.

STATED MEETINGS

Technical Association of the Pulp and Paper Industry.

Delaware Valley Section—First Friday of each month—Engineers' Club, Philadelphia.

Kalamazoo Valley Section — First Thursday of each month—Park American Hotel, Kalamazoo, Mich.

Lake States Section—Second Tuesday of each month—Conway Hotel, Appleton, Wis.

New England Section—Third Friday of each month — Roger Smith Hotel, Holyoke, Mass.

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▶▶▶ THE 20TH ANNUAL CONFERENCE of the National Industrial Advertisers Association will be held in Atlantic City at the Hotel Traymore in September of this year according to information from W. D. Murphy, president of the Association. According to the officers, this conference will act as a clearing house of ideas that can be used by advertisers, agencies, and publishers to help in the Defense Program and planning for the future.

The Paper Industry Safety Scores

July 1, 1941 to June 30, 1942

Out of 198 mills reporting for December, 20 have perfect record

PERFECT SCORES
Division I—Pulp and Paper Mills

PARTICIPANT	MILL	LOCATION
GROUP A		
GROUP B		
Raymond, Inc.	Shelton	Washington
Quebec North Shore Paper Co.	Baie Comeau, P.Q.	Canada
Hoberg Paper Mills, Inc.	Division "A"	Green Bay, Wis.
St. Croix Paper Co.	Woodland	Maine
GROUP C		
American Writing Paper Corp.	Parsons Div.	Holyoke, Mass.
The Mead Corporation	Harriman Div.	Harriman, Tenn.
American Writing Paper Corp.	Crocker Div.	Holyoke, Mass.
Marathon Paper Mills Co.	Ashland	Wisconsin
GROUP D		
*U. S. Gypsum Company	Board Mill	Lisbon Falls, Me.
U. S. Gypsum Company	Oakmont Mill	Oakmont, Pa.
U. S. Gypsum Company	North Kansas City	Missouri
Spaulding Fibre Co., Inc.	Milton	New Hampshire
Central Fibre Products Co.	Vincennes	Indiana
American Writing Paper Corp.	Mt. Tom Division	Holyoke, Mass.
*International Paper Co.	Livermore No. 11	Livermore Falls, Me.
*International Paper Co.	Riley No. 23	Riley, Maine
Spaulding Fibre Co., Inc.	Hayes	New Hampshire
Division II—Paper and Board Re-Manufacturing		
Thilmany Pulp & Paper Co.	Bag Mill	Kaukauna, Wis.
Bird and Son, Inc.	Roofing Plant	Shreveport, La.
Bay West Paper Co.	Green Bay	Wisconsin

*December report missing—covers five months only.

SUMMARY OF CONTEST EXPERIENCE

Division	Man-Hours Worked	Reportable Injuries	Frequency Rate 1941-42 (6 Mos.)	Comparison of Rates with 6 Mos. of 1940
All Divisions	107,181,571	1,782	16.62	+16%
Paper & Pulp	96,993,070	1,630	16.70	+14%
Group A	55,192,000	764	13.84	+16%
Group B	28,346,258	544	19.19	+13%
Group C	10,317,232	218	21.24	+ 8%
Group D	3,237,490	94	29.08	+37%
Paper & Board Re-Manufacturing	10,188,501	163	15.90	+34%

GET MORE TUBE "MILEAGE" WITH D. M. STEEL

Ever figure it out? The average size modern cracking still, chemical plant, or power plant uses from 200 to 5,000 feet of two to six inch seamless steel tubes. Some of these plants use more than a mile of expensive high temperature tubing.

If you're having trouble with creep and pressure, ask for more information about DM tubes. They are intermediate in cost. Maybe your operating conditions specifically call for high resistance to oxidation and corrosion. If so, ask for information about Sicromo steels. They're intermediate in cost, too, and give many times more service than carbon tubes — that's "mileage"!

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
SEAMLESS STEEL TUBES

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

KILL TWO BIRDS WITH ONE STONE

Increase your war effort and production by starting to use DM Tubes now. Then, later on, you will be in a better position to compete more favorably when Victory and Peace bring business back to normal again.

NAMES *in the* NEWS

Personals

M. A. MALONE NOW WITH M & O PAPER CO.

M. A. Malone, veteran lumber and logging executive at Fort Frances, Ontario (Canada), has been appointed supervisor of forest by-products operations for the Minnesota and Ontario Paper Company, International Falls,

M. A. Malone

Minnesota. This announcement was made by R. W. Andrews, senior vice president.

Until recently, Mr. Malone was general manager of Shevlin-Clarke Ltd. operations at Fort Frances, serving in that area and at Rainy Lake, Ontario, for more than 30 years.

In his present capacity, he is in charge of forest by-products operations, purchases, and sales. He will work with the logging department under the direction of C. A. Larson, resident manager at International Falls, and also will be in charge of logging and lumber for this company's mills at Fort Frances and Kenora, Ontario.

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▶▶▶ *Harry E. Houghton,* general sales manager of the Brown Company, Portland, Maine, has been appointed to serve as merchandising consultant to the office of Federal Security Administrator Paul V. McNutt. The duties of his new office will include the development of a national nutritional merchandising plan for the Office of Defense Health and Welfare Service, and the co-ordination of the nutritional activities of all industries with this plan. Mr. Houghton will continue as general sales manager for Brown Company, which concern he has been associated with for the past five years.

◆

▶▶▶ *Harold M. Moore,* a Reserve Army Officer and the St. Louis representative of Manning, Maxwell & Moore, Inc., Bridgeport, Connecticut, has been called for active duty. Mr. Moore has been commissioned as a Captain. This company also announces the appointment of James H. Withers as its new representative out of the Los Angeles office.

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▶▶▶ The newly appointed manager of synthetic sales of the B. F. Goodrich Company, Akron, Ohio, is *John R. Hoover.* He succeeds *Dr. H. E. Fritz,* who was recently made company director of research. *Herman C. Klein* has been appointed to fill the vacancy left by Dr. Fritz as manager of the rubber-lined equipment sales. Mr. Klein was formerly a sales engineer in the department.

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▶▶▶ *Ernest L. Kurth,* president of Southland Paper Mills, Inc., Lufkin, Texas, was recently elected a director of Union Bag and Paper Corporation, New York City. Mr. Kurth has been associated with forestry projects in both lumbering and paper fields for a long time.

Ernest L. Kurth

▶▶▶ The new package machinery consultant for Container Corporation of America in Chicago is *Freeman Higgins.* He will work under E. A. Throckmorton, head of the sales pro-

Freeman Higgins

motion staff and will be available to the company's customers for consultation. For the past nineteen years Mr. Higgins has been associated with Johnson Automatic Sealer Company and the Battle Creek Bread Wrapping Machine Company, both in Battle Creek, Michigan, in engineering, production, and sales capacities.

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▶▶▶ *R. Calvert Haws* recently joined the staff of the Western Precipitation Corporation, Los Angeles, California. Mr. Haws was formerly associated with the McCarthy Company, of Los Angeles, as an account executive and prior to that was with Henri Hurst and McDonald, and also head of his own agency. In his new position, Mr. Haws will assist Richard F. O'Mara, sales manager, in advertising and sales promotion.

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▶▶▶ *Ford M. Tussing* has been selected general superintendent of the Emeryville (Cal.) plant of the Paraffine Companies, Inc., San Francisco, to succeed the late James T. Coleman who passed away January 3. Mr. Tussing has been associated with this company for 15 years and received his training under the able leadership of the late Mr. Coleman. *Irving Hovgaard* will be the new assistant general superintendent succeeding Mr. Tussing.

The UNIFORMITY OF APPLETON FELTS HAS MADE THEM PREFERRED BY LEADING PAPER MILLS

make APPLETON FELTS good paper

Since 1890 Appleton Felts have kept pace with paper making until today they fully meet all requirements of modern paper mill fast speed production. They have the uniformity that only a rigid plant control can give them—one reason for their preference by mills everywhere.

Appleton Woolen Mills

APPLETON • WISCONSIN

NEW OFFICERS ARE ELECTED BY BRYANT PAPER CO.

At a special meeting of the board of directors of the Bryant Paper Company, Kalamazoo, Michigan, January 21, a new administrative group was named.

Dr. S. Rudolph Light, vice president and a member of the board, was elected president to succeed the late

Dr. Rudolph Light

Wm. J. Lawrence, and Ralph A. Hayward, president of the Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan, was made chairman of the board, also succeeding Mr. Lawrence.

Allan B. Milham, manager of Bryant's Imperial (coating mill) division, was elected executive vice president and manager of the company, and

Allan B. Milham

P. H. Gideon, treasurer, was advanced to secretary-treasurer. E. H. Larkin will continue as vice president in charge of western sales.

Louis W. Sutherland, president of the Sutherland Paper Company, Kalamazoo, Michigan, and William E. Lawrence, Jr., son of the late president, were added to the board.

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▶▶▶ At a recent board meeting of the T. B. Wood's Sons Company, Chambersburg, Pennsylvania, *C. O. Wood* was elected president to succeed *T. M. Wood* who was named chairman of the board. Other officers elected are: *W. H. Fisher*, vice president and sales manager; *C. M. Wood*, secretary and treasurer; *C. O. Wood, Jr.*, general manager.

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R. SICKLER OF SANDY HILL GOES ON ACTIVE DUTY

Russell L. Sickler, a member of the Reserve Army Corps and former engineer at the Sandy Hill Iron and Brass Works, Inc., Hudson Falls, New York, has been called into active service. Mr. Sickler who is a graduate of Norwich University has been associated with Sandy Hill for the past five years.

A farewell party was given in his honor by forty co-workers and executives of the company. Gifts were presented by R. E. Sory, naval inspector of this district. Frank Juckett, president of the company, was among those who addressed the party.

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▶▶▶ *Dr. C. F. Rassweiler* was recently appointed a vice president of Johns-Manville Corporation, New York City. Dr. Rassweiler joined this company last June as director of research. He will continue in charge of the company's research and development activities which are now devoted to converting the full production capacity to war uses.

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▶▶▶ *Fred A. Coe*, chief engineer for the West Virginia Pulp and Paper Company, Mechanicville, New York, has been promoted to assistant manager of the entire plant. Mr. Coe spent several years in the engineering department of the company in New York City and was transferred to Mechanicville in 1920.

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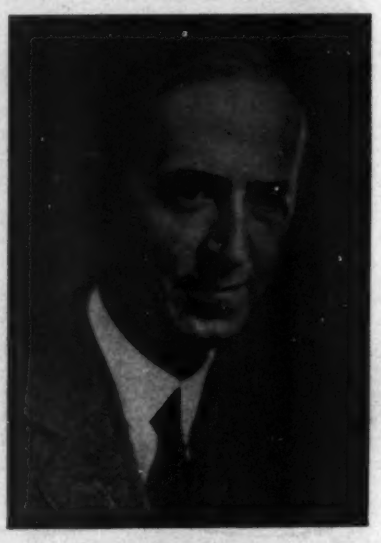
▶▶▶ *William A. Kelley*, formerly western manager for E. D. Jones & Sons Company, Pittsfield, Massachusetts, has been given a leave of absence so that he might go to Washington for the duration of the war to act as pulp and mill specialist for the WPB.

KALAMAZOO PAPER ELECTS SLATE OF NEW OFFICERS

Following a meeting of the board of directors of Kalamazoo Paper Company, Kalamazoo, Michigan, on January 21, announcement was made that Alfred E. Curtenius had resigned as president of the company and that George T. Jubb, company secretary since 1932, had been elected to suc-



Alfred E. Curtenius

ceed him. Mr. Curtenius was made chairman of the board.

Other changes in the official personnel were also announced. Bert H. Cooper, treasurer and purchasing agent, was advanced to vice president in charge of purchasing; James E. Wise, superintendent, was made vice president in charge of production; F. B. Curtenius was made secretary-

George T. Jubb

Wax Emulsions

TO REPLACE DRY WAX on Paper and Paper Boards

FIVE IMPORTANT ADVANTAGES... Paper machine treatments with wax emulsions may sometimes be used to advantage to replace dry waxing. It is granted that a film applied by this means is not comparable to a heavy coating of dry wax, but there are cases where heavy coats are not required or desired. The advantages of the use of emulsions versus dry waxing are as follows:

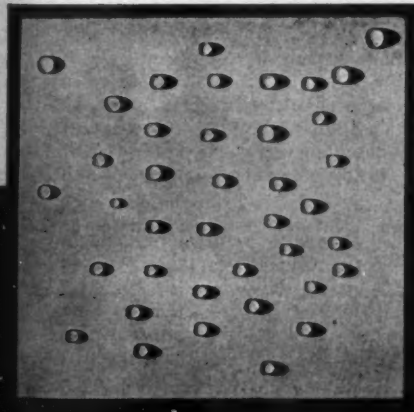
1. Wax may be applied at the paper machine, thus eliminating an extra operation.
2. The paper is not discolored as in the case of dry waxing.
3. Penetration of the wax into the sheet is better controlled.
4. Water soluble modifying ingredients may be used with the wax.
5. Application of wax emulsions does less injury to resistance to hot aqueous liquids than dry waxing.

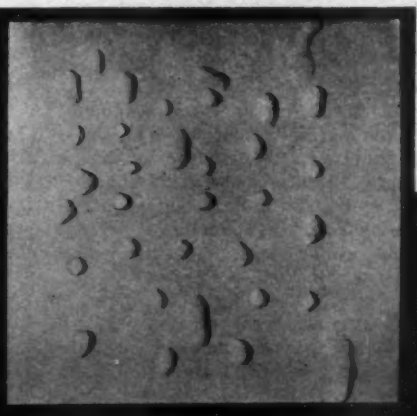
Effects secured by paper machine applications of wax emulsions are capable of wide modification. When wax is suspended in water, its absorption by paper is affected mainly by the water resistance of the paper which is more easily adjusted than resistance to absorption of molten wax. The degree of slipperiness of the sheet may also be controlled to a certain extent. Special emulsions have be... Cyanamid to do differen... others are in the development stage.

SIX IMPORTANT RESULTS... A number of effects may be secured by treating paper and paper board with wax emulsions. The more important ones are listed below:

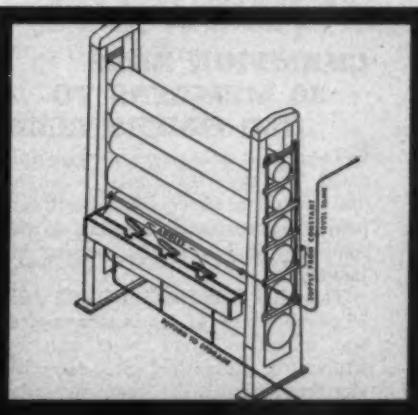
1. Smooth finish.
2. Increased resistance to scuffing and abrasion.
3. Lowered coefficient of friction.
4. ...er repellent effect.
5. ...reased resistance to the penetration of water.
6. Resistance to absorption of organic liquids, such as printing inks and varnishes.

Cyanamid Technical Service Representatives are experienced in the application of these products to secure the different effects and will be glad to discuss general and specific problems, in this connection, with you.

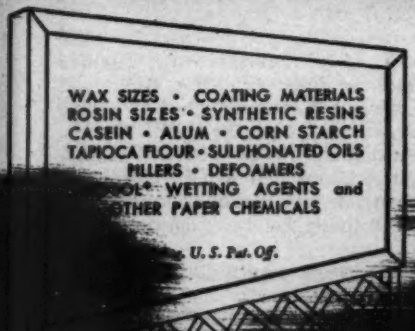




Unretouched photographs showing, *(upper left)* "duck's-back" effect of paper treated with Alwax size compared with paper, *(upper right)* that has not been treated with this material.



Design of water box that is very satisfactory for the application of chemicals to paper boards at the calenders. Enlarged detailed drawing on request.


WAX SIZES • COATING MATERIALS
ROSIN SIZES • SYNTHETIC RESINS
CASEIN • ALUM • CORN STARCH
TAPIOCA FLOUR • SULPHONATED OILS
FILLERS • DEFOAMERS
...OL® WETTING AGENTS and
...THER PAPER CHEMICALS
... U. S. Pat. Off.

American Cyanam... Chemical ...poration

30 ROCKEFE... ...ORK, N. Y.

...Street, Philadelphia, Pa.; ...evard, Charlotte, N. C.; 850 Leader ...ve., Chicago, Ill.; Miller Road, Kalamazoo, Michigan; ...900 Shell Building, St. Louis, Missouri; Azusa, California

treasurer. Messrs. Jubb, Cooper, and Wise were added to the board of directors.

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▶▶▶ The proud military record of the Clarke family of Canada includes the father, *Lieutenant-Colonel Frank W. Clarke,* for many years honorary colonel of the Royal Rifles of Canada, and four sons in the service. The oldest son is *Captain William Frank Clarke,* 29, who is in Hong Kong. The second son is *Flight-Lieutenant George Dunn Clarke,* 28, now stationed at Rockliffe Training Centre. *James Walter Clarke,* 26, enlisted as a private with the Royal Rifles at the outbreak of the war, and recently reenlisted in the reconstituted battalion. The youngest of the four Clarke sons is *Lieutenant John Macguire Clarke,* who is with the Royal Canadian Navy. Frank W. Clarke is connected with the Anglo-Canadian Paper Mills, Limited, Quebec.

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▶▶▶ Three new salesmen for the Norton Company, Worcester, Massachusetts, have just been appointed. *R. D. Lawson* was made salesman of the Machine Division for northern New England succeeding W. E. Wickstrom who will take over sales engineering work at the main office. *James K. Stevenson* and *Paul F. Sparrow* have been appointed salesmen for the Refractories Division and will have their headquarters in Chicago and Pittsburgh respectively.

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CHAMPION ADDS 26 MEMBERS TO OLD TIMERS' CLUB

Twenty-six new members were initiated into the Old Timers' Club of the Champion Paper and Fibre Company, Canton, North Carolina, at the company's eighth annual meeting on January 9.

This club, honoring employees with 25 or more years of continuous service, was organized eight years ago by Reuben B. Robertson, Sr., executive vice-president of the company, who acted as host at the meeting. There are now 159 members of the club. The new members were presented with club emblems and bronze watch charms, each bearing the insignia of the company and the name of the employee.

Those initiated into the club were: L. Gus Cody, Mitch McKinnish, Dewey Fletcher, C. C. Jones, Samuel W. Jamison, Charles Williams, Troy Smith, Floyd Webster, Joe E. Childers, George Ward, J. Erskine Mathis, M. Burrell Warren, Munroe Parris, H. Nelson Mease, Claud J. Hardin, J. Harrison Duckett, J. Lawrence Hall, David H. Brown, J. Fred Earley, George E. Morgan, Wayne Smathers, and Miss Sibyl Wilson, the second woman member. Miss Mae Holtclaw, private secretary to Mr. Robertson, was the first woman member.

◆

OAKITE SETS UP 2 NEW DIVISIONS TO SERVE MILLS

Two newly created divisions to meet the increasing needs of pulp and paper mills in the New England and Southwest sections were opened January 1 by Oakite Products, Inc., New York City.

The New England Division, Hartford, Connecticut, is headed by T. R. Smith, recently appointed divisional manager, who will supervise 11 men. The second new division is located in St. Louis, Missouri, and will be headed by S. C. Shank, who directs the activities of 12 men.

T. R. Smith

S. C. Shank

Both Mr. Smith and Mr. Shank are well known for the outstanding technical service and co-operation they have rendered to pulp and paper mills in their territories on a wide range of cleaning and related work, such as cleaning save-alls, dandy rolls, suction boxes, fourdrinier wires, and other equipment; washing felt on or off machine; removing lime-scale deposits from vacuum pumps, evaporators, heat exchangers; etc.

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▶▶▶ At a recent meeting, *R. H. Laftman,* general manager for the National Container Corporation, Jacksonville, Florida, was elected a vice president of this company.

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▶▶▶ The present war in the Far East is of special interest to *A. H. Silverstone,* purchasing agent for The Paraffine Companies, Inc., San Francisco. Mr. Silverstone is celebrating thirty years with the company. He served in World War I, and in line with his duties as purchasing agent, he spent some time in China and Japan in 1930, 1935, and 1937 buying rags which are used in the manufacture of the company's roofings and floor coverings.

▶▶▶ After stating that most New York skyscrapers are not bomb proof, *James F. Lincoln,* president of the Lincoln Electric Company, Cleveland, Ohio, left on a war industry speaking tour and will urge the use of arc welded construction to minimize bombing damage. He started on January 12 and will travel to seventeen cities to speak before key men in the industry. The talks will also be concerned with speeding war production by means of arc welding.

Necrology

THEODORE ROBERTS

After a courageous stand to carry on his duties as sales engineer for the Beloit Iron Works (Beloit, Wis.) through several years of ill health, Theodore C. Roberts, well known to many in the pulp and paper industry, passed away January 18 at his home in Turtle Ridge, near Beloit. He was 39 years of age.

Mr. Roberts was born in Beloit, and became affiliated with the Beloit Iron Works following his graduation from the Beloit High School. He had served as head of the order department, and at the time of his passing was sales engineer. He was a member of the American Pulp and Paper Mill Superintendents Association.

Due to his years of association with such a prominent company in his native city, Mr. Roberts was active in many local and civic affairs, and he will be missed both by his company and the community. He is survived by his widow and a daughter.

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▶▶▶ *Daniel A. Smith,* prominent in the paper industry for more than 40 years, passed away January 25 at his home in Chevy Chase, Maryland, at the age of 71. Mr. Smith was vice president and a director of the District of Columbia Paper Mills, Georgetown, Delaware. He organized the District of Columbia Paper Manufacturing Company, now the District of Columbia Paper Mills, and served as general manager until 1935. Surviving is his widow.

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▶▶▶ *A. A. Macdiarmid,* former chief engineer of Price Bros. and Company, Kenogami, Quebec, passed away January 7, at the age of 57. Mr. Macdiarmid was educated at Huntington Academy and McGill University, Montreal, and began his career with the Bathurst Lumber Company, Bath-

urst, New Brunswick. He was also associated with the Mattagami Pulp and Paper Company, and the Anglo-Newfoundland Development Company. It was after this affiliation that he became associated with Price Bros., where he remained until the time of his passing.

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▶▶▶ *Clifford J. Munce,* 52, president of six large corrugating box companies, passed away in London, Ontario, January 26. Mr. Munce was the organizer of the Hygrade Corrugated Products, Ltd., London, Ontario, in 1924. He also organized the Canadian Boxes, Ltd., Vancouver; Western Containers Corporation, Seattle, Washington; California Container Corporation, Emeryville, California; and assisted in opening the Kraft Container, Ltd., Hamilton, Ontario; and the Hygrade Corrugated Cases, Ltd., Southwall, England. Surviving are his widow and two daughters.

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▶▶▶ In 1938, *James T. Coleman* became general superintendent of the Emeryville (Calif.) plant of the Paraffine Companies, Inc., San Francisco. On January 3, Mr. Coleman passed away, terminating an association with his company which began 27 years ago when he started in as a machinist.

◆

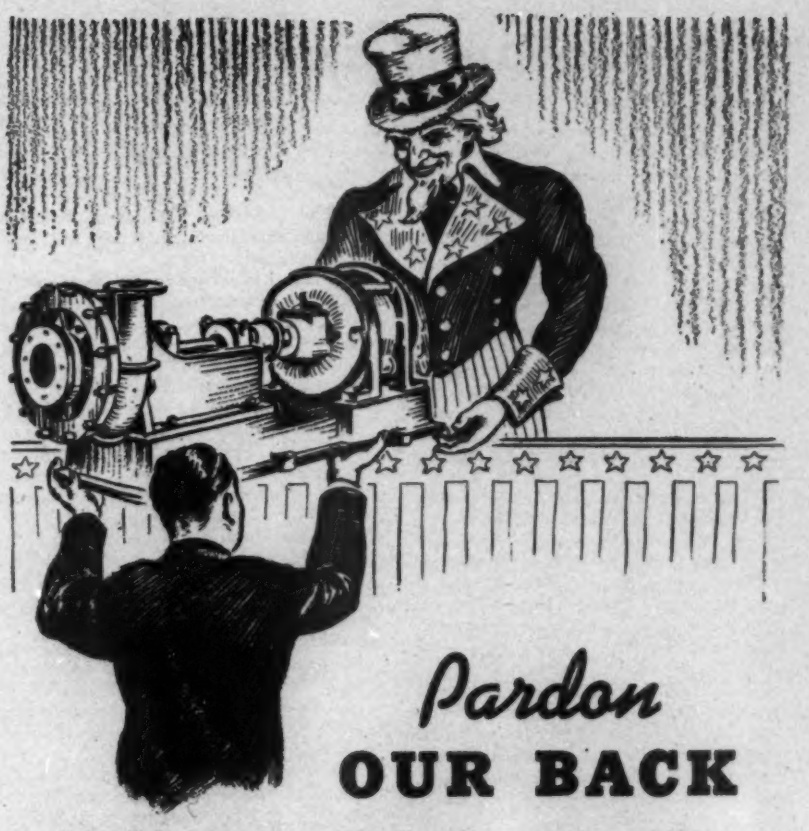
HORACE W. DAVIS

Horace Webber Davis, 58, president of the Eaton Paper Corporation, Pittsfield, Massachusetts, passed away January 28 in Nassau, the Bahamas, where he was on his wedding trip with his bride of a week, the former Miss Florence W. Pertsch of New York.

Mr. Davis received his B. S. degree and masters degree from Washington and Jefferson College in 1905 and 1907, and a law degree from George Washington University Law School. From 1915 to 1917, he served as deputy attorney general of Pennsylvania.

In 1917, Mr. Davis became vice president of the Finance and Trading Corporation of New York and from 1920 to 1922 served as chairman of the board of the Williams Tool Company. He was president of the Ansco Company in 1922 and 1923; president of Ansco Photo-Products from 1923 to 1927, and president of Agfa-Ansco from 1927 to 1932, and was instrumental in the formation of the last corporation. In 1933, he went to Pittsfield to reorganize the Eaton, Crane & Pike Company as the Eaton Paper Corporation and was elected president.

Surviving are his widow, two daughters, and three sons.



Pardon
OUR BACK

It's all because our centrifugal pumps are mighty good. Uncle Sam heard about it . . . you know how those things get around . . . and said to us, "Boys, I need you for the duration." So here we are . . . most of the time facing Uncle Sam . . . our back to you temporarily.

But if our pumps weren't good, Uncle Sam wouldn't use them, and you wouldn't want them, either. So in asking your indulgence for being unable to serve you as fully and as promptly as we would like, we also ask you to remember that when the war is over, we'll be all the better prepared to build pumps for you of the same excellence that made Uncle Sam call on us.

Meanwhile, our engineering department is at your service for advice on making your present pumps give better service, and for recommendations on future centrifugal pump requirements.

MORRIS MACHINE WORKS — MORRIS — ESTABLISHED 1864 — BALDWINSVILLE NEW YORK

CENTRIFUGAL PUMPS

Convention Papers . . . Abridged

Tub Sizing

J. P. STRASSER
Stein, Hall Manufacturing Company

Tub sizing has become a more important adjunct of papermaking in the past five years. The causes for its increasing use, are greatly increased flexibility in meeting varied specifications, and an easier method of imparting specific desired characteristics to a sheet of paper.

Most tub sizing is done with starch. Tapioca flour and corn are the two main sources of raw materials. Potato and wheat are satisfactory but are used but little due to their higher cost. The types of starch used in tub sizing are raw starch, thin boiling starch, dextrines, chlorinated starches, and enzyme conversions of raw starches. Raw starch is satisfactorily used in paper such as mimeo where control of linting is desired, and minimum of starch used because of its adverse influence on the absorption of ink. Thin boiling starches are used but very little because of poor film, stratification, and a setback or jelling, which is characteristic. Dextrines have desirable characteristics from the standpoint of viscosity. However, the unit of strength per pound vs. more desirable conversions is relatively low. The filming characteristics are very poor, and this type of conversion has a foam condition which is much harder to control. Chlorinated starches are justly rated as the best for tub sizing. There is a lesser tendency of jelling than with other types of conversion, little or no stratification and exceedingly good film, and little or no tendency to foam.

In regard to enzyme conversion of starch, we must differentiate between corn and tapioca flour. Tapioca flour inherently has far less tendency to set back than corn; it has inherently a good film which is not destroyed by enzyme conversion; it converts with little or no stratification; and it does not present a foam problem. It is comparable in every way with a chlorinated starch. Where the mill has adequate technical supervision and satisfactory cooking equipment, it presents no problems.

Enzyme conversion of corn has not been as satisfactory as tapioca. In many cases, the end products are comparable to a thin boiling starch, or dextrine. Mills report operating difficulties, and in general, its main attraction has been price. However, many organiaztions have very successfully been able to adopt enzyme conversion of corn to their processes because of detailed study of proper equipment and proper control.

Tub sizing is either by immersion or by surfacing straight through the nip. In the selection of a tub sizing starch, the physical factor and the use factor must be given consideration. Tubbing is an aid physically in controlling fuzz, improving Mullen and fold, imparting a handle to the sheet, and improving finish. The use factors that are important are the printing characteristics such as pick and ink absorption, and the writing characteristics such as pen and ink, erasure, and fuzz.

Measurement of the Stiffness in Bending of Single Fibers

C. O. SEBORG[1] and F. A. SIMMONDS[2]

This report, a second one dealing with fiber stiffness, describes a method for measuring the stiffness in bending of single pulp fibers. The previous publication (Seborg, C. O., Simmonds, F. A., and Baird, P. K. *Paper Trade J.* 109, 8:35-42, August 24, 1939) dealt with a test for determining the recovery of a wet pulp mat from compressive deformation, which was assumed to be chiefly a manifestation of fiber stiffness.

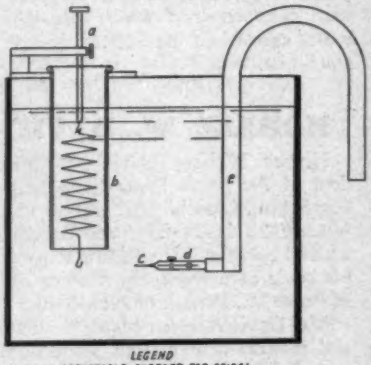
(1) Assistant chemist and (2) associate chemist, Forest Products Laboratory, U. S. Department of Agriculture, maintained at Madison, Wisconsin, in co-operation with the University of Wisconsin.

Sulphate and sulphite pulps made from springwood and summerwood portions of southern pine were selected as representing the extremes of fiber stiffness aside from what variation may exist in different species.

Three-eighths inch thick discs of green southern pine logs were cut and examined by transmitted light and all sections of blue stained and compression wood were removed. The springwood and summerwood rings in the remaining portions were carefully separated and reduced to chips by hand cutting. A sulphate pulp and a sulphite pulp were prepared from both the springwood and summerwood chips.

The wood and pulps prepared from it were maintained above fiber saturation at all times prior to determining the stiffness of single fibers in water as the surrounding medium.

The apparatus developed is illustrated schematically by Figure 1. A single fiber is held by clamp (D) which is connected through arm E to a device for moving the clamp in both the horizontal and vertical planes and rotating it about its long axis. Suspended in tube (B) is a calibrated quartz spiral spring with the high sensitivity of 5 cm. of elongation per milligram



LEGEND
a-ADJUSTABLE SUPPORT FOR SPIRAL
b-GLASS TUBE
c-FIBER
d-CLAMP
e-CONNECTION TO MECHANICAL STAGE

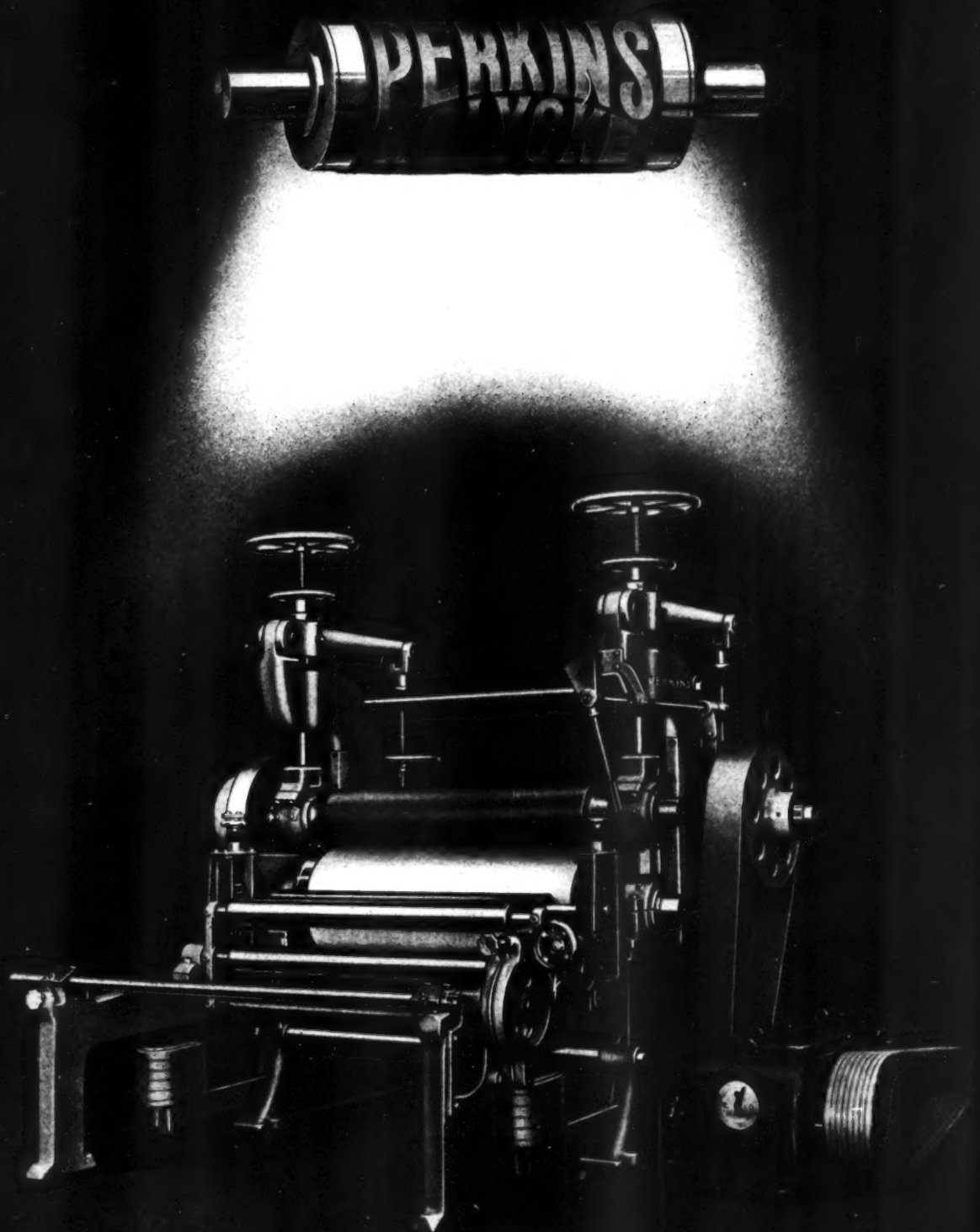
Figure 1

of load. The amount of extension of the spiral is measured with a cathetometer readable to 0.005 cm.

The glass-sided enclosing tank provides the means for making the determination in liquid media as well as air. The measurements reported in the present study were made in water maintained at a temperature of 22 C. ± 1.

In the cases of the sulphate springwood

This is the final installment of abridgments of papers presented at the fall meeting of the **Technical Association of the Pulp and Paper Industry** held at Ann Arbor, Michigan, September 15-19, 1941. Beginning with the October, 1941 issue, these abridgments have appeared in regular installments.



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and summerwood pulps, three groups of 25 fibers each were tested, with two sets of four measurements for each fiber. An analysis of variance then indicated that, with occasional but identifiable exceptions, the sample size could be reduced to 25 fibers and also the duplicate measurements omitted for the four positions of each fiber. Consequently, only 25 fibers were tested for each type of sulphite fiber but duplicate determinations were made in order to verify the previous conclusion.

The single fibers selected as test samples were whole and undamaged, and were straightened, in so far as possible, prior to test.

In addition to the variation in inherent fiber stiffness, it was observed that torsional rigidity, surface friction, and visible surface irregularities, such as fibral stubs, pits, and small bends, are factors which influence the test value.

Results show the summerwood fibers of both the sulphate and sulphite pulps were approximately five times stiffer in water than the springwood fibers. An effect of pulping is indicated by the fact that the sulphate springwood fibers were about 20 per cent stiffer than the sulphite springwood fibers and the sulphate summerwood about 50 per cent stiffer than the sulphite summerwood. The influence of lignin content is one of the factors that must be studied, however, before generalizations can be made concerning the effect of pulping process on fiber stiffness.

Data dealing with the influence of moisture content on the stiffness of fibers are now available, and it is expected that these will be published later.

Adhesive Economies in the Use of Calcium Carbonate Coating Colors

H. F. RODERICK and A. E. HUGHES
Michigan Alkali Company

Some two years ago, our Research Department instituted a program, simultaneous with a study of the normal physical properties of calcium carbonate, to ascertain possible reasons for the wide variance in adhesive demands of coating pigments though they are reasonably comparable in particle size. We asked ourselves: Is it inherent in the products that their adhesive demands be different, or is it that, the pigments being different, they require different treatments to utilize them advantageously?

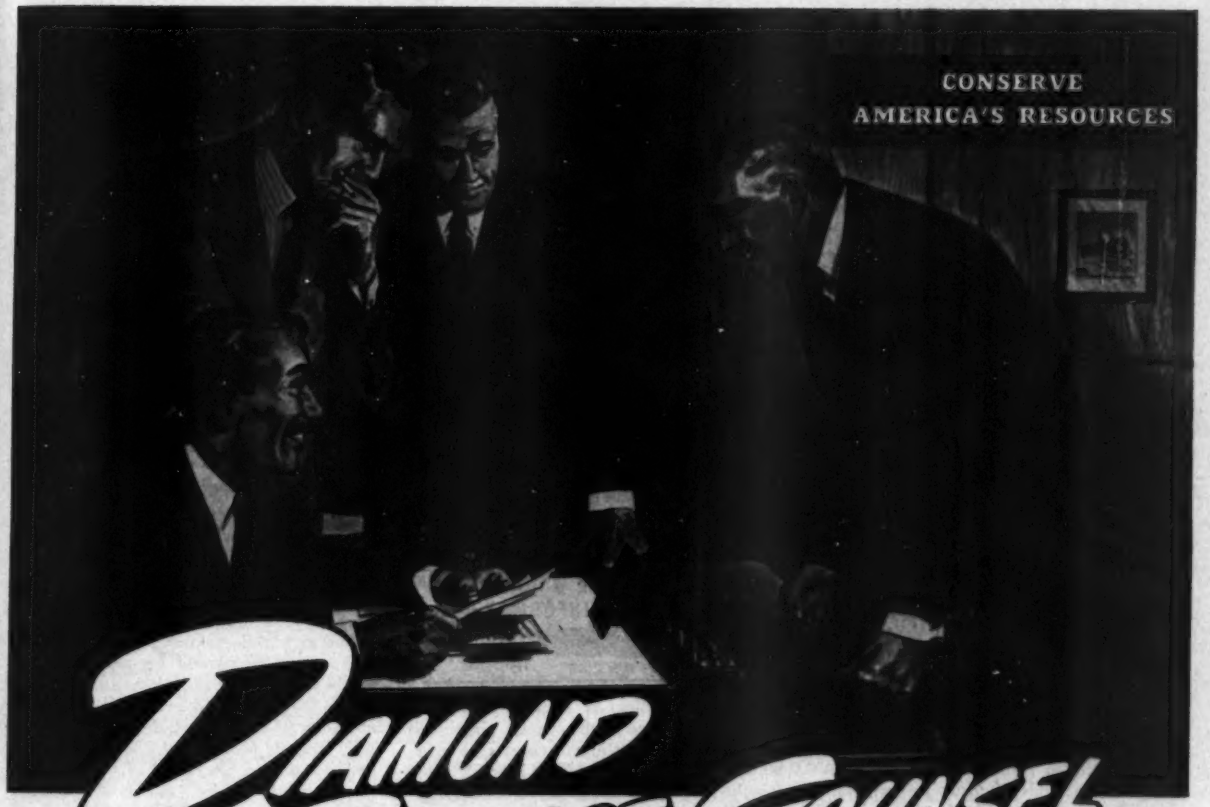
Assuming the first line of reasoning to be true, considerable work was devoted to producing a high quality paper coating grade of calcium carbonate having a low adhesive demand. The results obtained were discouraging. Our research men chose, however, to be optimistic notwithstanding and to determine whether a difference in manipulation in the preparation of the pigment dispersion and preparation of the coating color could be the controlling factor.

Although the physicochemical properties of paper coatings are not very well understood, it is reasonable to assume that a thorough dispersion of the pigment, approaching that of the ultimate particle size, is highly desirable. Further, it is essential that the adhesive be in intimate contact with the pigment particles, so that a matrix-like arrangement may be formed which has strength enough to undergo the printing operation without breaking. Any of the steps in the processing of the coating color which may affect these factors no doubt have a direct bearing upon the amount of adhesive required for any specified wax test.

The ease with which the surface of various pigments may be wet varies considerably. This property alone controls to a great extent the degree of dispersion and the nature of the contact or bond between the surface of the pigment particles and the adhesive.

Clay and satin white were among the first pigments used for coating paper and it is only natural that methods suitable for their use were developed first. However, within the last few years we note the advent of a number of other pigments in the field, among which is precipitated calcium carbonate. It has been the normal course of procedure to subject these newer pigments to the same treatment in the preparation of the coating colors which has been successful with the older, well-established materials. The use of these methods has been a necessity and not a matter of choice on the part of those concerned with the preparation of coating colors. Other methods simply were not available and it has required considerable time for their development.

An extended study by our laboratory has



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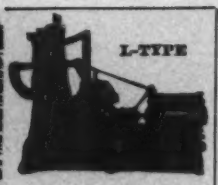
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shown that certain methods, both chemical and physical, are more suitable for the preparation of coating colors from precipitated calcium carbonate than the generally used methods of many present coating mill practices. Various other laboratories confirm these findings.

Aside from the nature of the pigment, there are a number of factors which influence the adhesive demand of the coating mixture. Before discussing the methods employed in preparing the coating color, it may be well to mention some of these factors.

The weight, degree of sizing, fiber and processing of the raw stock all have an important bearing upon the amount of adhesive which must be incorporated into the coating color in order to obtain a given bonding strength in the finished sheet. It is possible to select a raw stock for use with a given pigment combination which will result in a considerable reduction of the amount of adhesive required for a definite wax test.

Considerable evidence has been accumulated on the method of dispersing the adhesive to be used with various pigments. With respect to calcium carbonate, it may be stated that methods have been devised for the dispersion of the adhesive whereby the adhesive requirement for a 5 to 6 wax test is reduced 40 to 50 per cent.

The actual adhesive requirement of a blend of two or more pigments is not always the arithmetic average of the adhesive demands of the individual components of the blend. Blends prepared from precipitated calcium carbonate and clay serve well to illustrate this principle.

The 50-50 blend tends to approach that required for clay itself. Blends carrying only 10 to 25 per cent of precipitated calcium carbonate require almost the same amount of adhesive as does the clay, and for wax tests above 8 and 9 the requirement is less than it is for either of the individual components.

Moving a step further in the process of preparing the coating color, we come to the preparation of the various pigment slips by water dispersion, augmented by small amounts of wetting and dispersing agents before the final addition of the size. Our investigations carried out within this field show that, by a departure from common practices of preparing the slip, the required amount of adhesives for calcium carbonate may be reduced as much as 30 to 40 per cent, and in some instances as much as 50 per cent.

The work done in the laboratory in this connection was extended to several types of dispersion apparats, including the colloid mill, roll mill, kneaders or dough mixers, etc., and results were obtained by manipulating each type of equipment in various ways.

Preventive Maintenance for the Paper Machine

P. H. TIGWELL, Sales Engineer
Beloit Iron Works

Very often machinery of identical design and operating under similar conditions will give excellent results in one mill, and fail in another. In some cases, this is due to faulty design or defective materials, but usually it is due to the difference in the care and attention given the equipment.

The care and maintenance of all paper mill equipment should be placed in the hands of the most skilled mechanics—men who are anxious to know, and capable of knowing all about the hidden construction, and how to proceed with adjustments if and when they are required. Even men of this ability require (and should receive) all possible assistance from the builder of the machine in the way of detailed instruction covering the proper operation and care of the equipment. The machine builder sincerely desires to furnish such instruction. In order for the mills to gain the most from them, the instructions should be arranged and handled systematically and placed in the hands of capable men.

Careful analysis of reported mechanical failures from the mills reveals that a very large percentage of them is due either to lack of lubrication, or to the use of lubricants of improper characteristics.

Surprisingly often, the oiling is found to be in the hands of men entirely incapable of understanding the requirements of modern machinery, or machinery of any kind, old or new. Obviously, the most economical results cannot be expected from such procedure, and much can be accomplished

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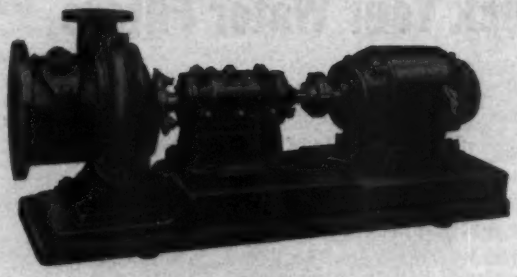

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in the way of lowering maintenance expense by bettering the personnel in the direct supervision of this important work.

We all realize the importance of preventive inspection. The question is: How can it be brought about in an economical way? It is probable that no set plan can be evolved to fit every mill organization; but, with your permission, I shall outline a general set-up arrived at from knowledge of various plans already in practice in many mills, and a few suggestions of my own:

1. Every machine in the mill is to be assigned a number; in case of machines having a multiplicity of parts, such as a paper machine proper, every bearing and roll or sub-assembly or, in fact, any part which is liable to require inspection or maintenance, should be assigned an identifying symbol or number in addition to the identification number for the machine proper. Some mills already have this in effect, or at least partly so. This should be accomplished for the purpose of identifying and properly recording the inspector's reports, and for the posting of cost of the work done on these parts.

2. A set of index cards is to be provided and properly filed, with each machine or sub-part having a card bearing its identifying number. These cards should be so arranged as to tie in with the cost department system, so that they are used for noting the work done on the part as well as the cost of the work, and the date on which it took place. Many other notes for future reference can be posted on these cards, such as the date when the part was last carefully inspected, amount of lost time when the repairs were made, etc. Should failures occur and continue, these records will prove to be of great value in helping to determine what the future attitude should be toward the repairing of the part involved.

3. Many mills combine the jobs of oiling and wiping the machinery. It is suggested that these two jobs be completely divorced, and the job of lubricating and inspecting be combined, and given the title of Equipment Inspector. To take care of this job, the best mechanics available should be selected and compensated accordingly, and every possible effort made to add dignity to the work. If each tour now has an oiler, each would be preferably replaced by men of this selection, but in every case the man in charge of this work during the day tour would be the most capable to be obtained. These men would not only provide for proper lubrication, but as they did so, they would be on a constant lookout, and capable of unearthing mechanical troubles which might be expected from reasons other than lack of lubrication. These men would circulate about the mill, and soon set up a routine that would provide that every piece of equipment be inspected and cared for as often as the circumstances might require.

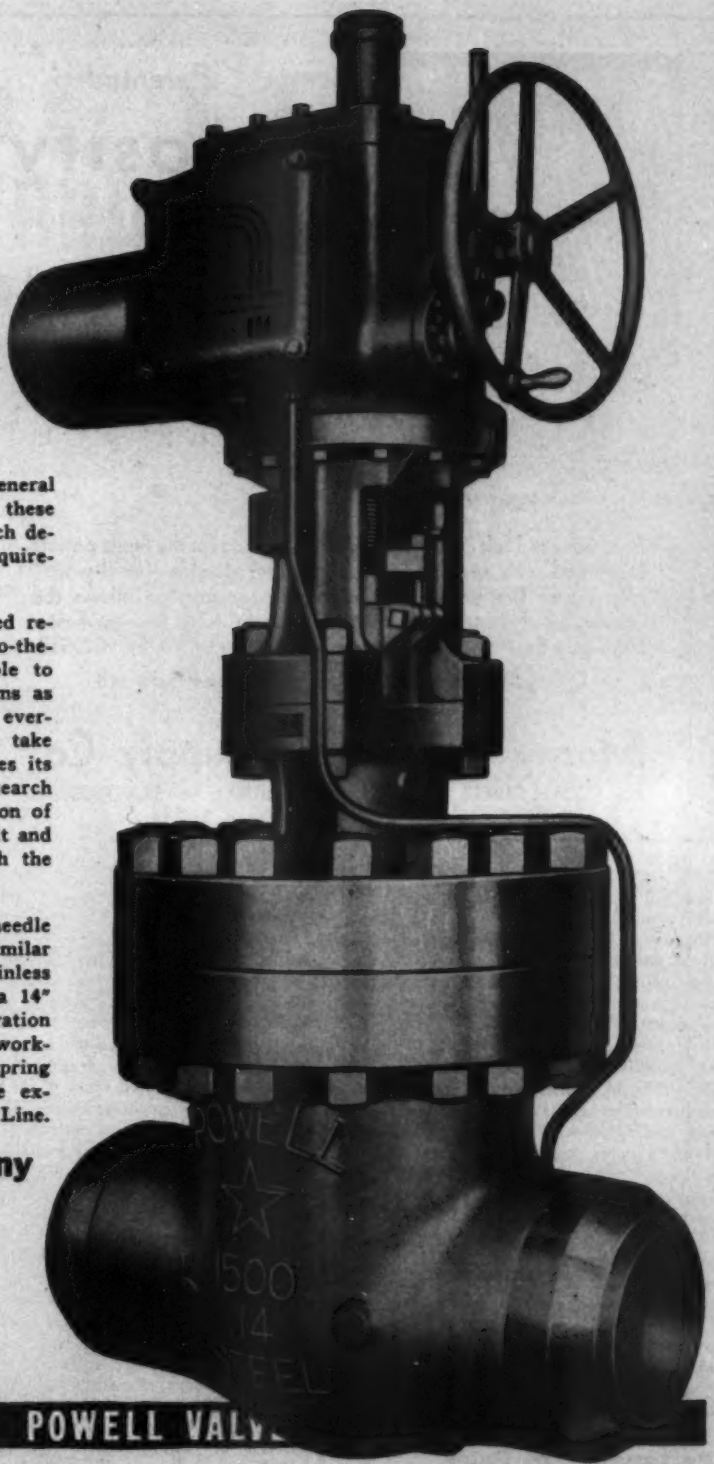
They would be provided with reporting blanks on which they could make written reports of the important happenings during their time of duty. In making their reports, they would use the symbols and numbers which had been assigned to the machines or individual parts. These reports, together with close cooperation on the part of the maintenance department, would aid materially in the planning and scheduling of repair work.

These men would be selected for their mechanical ability, loyalty, ambition, mental and physical alertness; in every case they should have good senses of sight, hearing, smell and touch. Bearings that are noisy and rough, the smell of hot oil, whining gears, loose parts, misaligned rolls, shafts and bearings, and all similar things which are the beginning of most failures will not escape the attention of competent mechanics who also have these other characteristics. Good mechanics cannot endure such things, and will not rest in peace until correction has been made.

Probably your first impression will be that to institute a plan of inspection of equipment along the lines of this one suggested would be too expensive to operate. Men having these capabilities cannot be had at the same rate that most mills are now paying to the men who supervise the lubrication of their equipment; but it is contended that this difference will be infinitesimal in comparison with the savings that would be realized in maintenance expense alone, to say nothing of the savings from increased production by greatly reducing the time lost for making repairs and adjustments. In the smaller mill, it is possible that these responsibilities might be added to those of the Master Mechanic.

The equipment inspectors should be

BETWEEN *these* EXTREMES



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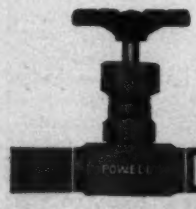

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supplied with all the data obtainable on the operation and care, as well as the construction of the machinery under their care. Until they are perfectly familiar with the construction, they should, in every case, assist in making all major repairs and adjustments.

A special word on roll grinding would not be amiss here. Several mills are giving their rolls the benefit of scheduled grinding with excellent results. A roll ground regularly will provide a good surface for the sheet of paper, giving it a higher finish; will give more even drying conditions, longer felt life, longer wire life, and better operating conditions. Barring accident, roll surfaces go bad on schedule. Thus a grinding program can be worked out to insure good roll conditions by grinding them in time.

Maintenance is a subject that should receive an increasing amount of serious thought. We must take good care of our machinery today as it is going to be hard to replace for a long time to come.

Personality in Sales

ARTHUR SECORD, Department of Speech University of Michigan, Ann Arbor

A man may study for years and be an accomplished student of the professional attributes of his calling but, regardless of his knowledge and skill, unless he likes people and enjoys rendering service he will never excel in the sales field.

The elusive quality which makes one man a superb salesman and another man, of equal intelligence and training, a mediocre salesman, can be called "sales personality." The word personality has been effectively defined as "evaluated individualism." This definition implies that one's personality depends not upon what he is but upon what someone believes him to be. It is the sum total of the reaction of some person to all of his characteristics, good and bad, at any one time. In a limited space it can best be discussed by commenting briefly upon the outstanding positive characteristics which compose an effective sales personality. We shall mention six.

1) Good health is the basis of any normal human functioning. He who is interested in operating at peak over a long period of time will develop a hobby which will serve as an antidote for the particular type of work by which he earns his living.

2) The knowledge which is essential to a salesman falls roughly into two categories. In the first place there is general information. Knowledge of many fields, of human nature, of his own strong points and shortcomings are necessary to one who would succeed in selling. Each customer has hobbies, interests, hopes, fears and disappointments—know them! Not only is the widely informed man a tolerant man but only when a salesman is armed with knowledge and intelligence, which permit him to meet each prospective customer on common ground, can he secure that confidence, admiration, and respect that is essential for selling.

The second type of knowledge which is important to the salesman is knowledge of the specific line of merchandise which he represents. This needs no explanation.

3) The true salesman, the man who really possesses a "sales personality," never permits the customer on whom he is calling to learn about his failures, his disappointments, or his aches and pains. He is at all times cheerful in both appearance and manner. A genuine cheerfulness, coupled with a sense of humor (which is used within proper bounds) is another essential quality of a salesman.

4) When a salesman is discourteous, his action is usually the result of ignorance, lack of self-control, or of being confronted by a situation with which he feels incompetent to deal. No salesman can afford to display any one or any combination of these. With this in mind we may conclude that courtesy is another fundamental of an effective sales personality.

Closely allied with courtesy is a quality usually called "tact." It is the ability to let the other fellow have your way. He who possesses it is able to disagree with a person without being disagreeable. It involves the intelligent application of courtesy plus adaptability. A simple example of what is meant by adaptability may be of assistance. Many times we hear a man, with whom we are conversing, mispronounce a word. Perhaps it is in our home, on the street, over the back fence or in a sales interview. If we are truly adaptable we will either avoid the use of that word while talking with this person or, that being impossible, we will use his pronunciation. It is simply the technique of permitting those about us to retain their self-respect.

5) The ability to make and hold friends. The degree to which an individual utilizes the points already discussed determines, in no small way, his ability to make and hold friends. Friendship is still the basis of all business and the salesman who makes friends of the customers on whom he calls, and keeps that friendship, is an asset to the organization with which he is associated.

6) An appreciation of the duality of service. We hear much these days concerning the rise of "service" as a fundamental motive behind business endeavor. Just where does the individual fit into this picture? Each of us is primarily interested in serving his own selfish ends. When a decision must be made, to do or not to do some particular thing, grounds must be found upon which to base it. Most of us make such decisions in this manner—Will this be a good thing for *me?* Upon what other grounds can anything be decided? And why is this not the perfect test? If a specific action is good for you, it is also good for your employer and your fellow employees, because if in any detail it injures one of them it is not good for you. In *Hamlet* Shakespeare has Polonius say,

"To thine own self be true.
And it must follow, as the night the day,
Thou canst not then be false to any man."

On the principle of the duality of service, anything which honestly helps an individual also helps the group with which he is associated. And conversely, any action which helps the group cannot but reflect beneficially upon the person who was responsible for it.

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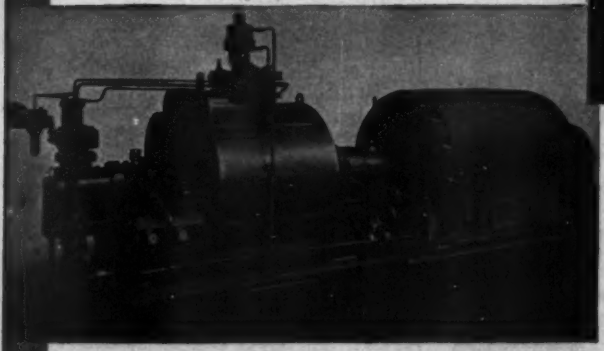

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He easily makes and holds friends.

He knows that through service to the group can he most effectively serve his own selfish ends.

The Evaluation of Methocel as a Pigment Adhesive for Paper Coatings

R. M. UPRIGHT[1], MYRON KIN[1] and F. C. PETERSON[1]

Pigment coating slips were prepared from clay, satin white, titanium dioxide and a 75 per cent clay—25 per cent calcium carbonate blend. Methocel (2) and casein were added as the pigment adhesive in amounts ranging from 12-28 per cent of the weight of the coating pigment. After coating, the calendered sheets were evaluated for pigment bonding strength, ink receptivity, smoothness, opacity, gloss, brightness, flexibility, and printability.

Certain properties of Methocel (Upright, R. M., and Peterson, F. C., *Paper Trade J.* 110 No. 18, 31-5, 1940; *Tech. Assoc. Papers* 23; 383-387, June, 1940); namely, its freedom from color and odor, high pigment bonding strength, film flexibility and toughness, high heat resistance, neutrality of solution, and its resistance to chemical and bacterial action are valuable pigment adhesive characteristics.

The Methocel used in this study was representative of the lowest viscosity material commercially available, namely, the 15 centipoise (3) type. It was employed in the form of a 10 per cent aqueous solution.

The pigments were added on an O.D. basis, and wet with sufficient water to give a smooth dispersion after mixing. The clay and clay-calcium carbonate pigment slips were prepared by pugging in a mixer for one hour, while high speed stirrers were used with the titanium dioxide and satin white dispersions.

The coating raw stock employed was representative of an average coating grade. Its properties were as follows:

Basis weight (25x38-500)	pounds	44.0
Thickness	inches	.004
Bursting strength	lb./sq. in.	17.6
Tear	grams	
Machine direction		54.0
Cross direction		71.6
Valley size test	seconds	34.7
Smoothness (Williams)		+12
Opacity		.920
Brightness	per cent	78.5
Dennison wax number		
Felt		9
Wire		12
Ink receptivity, % brightness of ink smear		22.8

The required amount of adhesive solution was weighed into the pigment slip to give the desired dry adhesive to pigment ratio, and then stirred for one hour. This mixture, constituting the coating color, was brushed through a 180-mesh screen. In each case, the amount of screenings were sufficiently small to be neglected.

The per cent solids and viscosity of each coating color were determined before coating.

The coating color was applied by means of a Martinson single sheet laboratory coater. The rawstock was cut into sheets 8½x12 inches, and placed felt side up on the coater with their machine direction parallel to the coating doctor. The coating color was poured on the edge of the sheet nearest the doctor blade, and the sheet was then immediately pulled under the blade with a smooth stroke.

Following the adjustment of the coating weight to the desired value of 16 lb. ± 1 lb. per standard ream (25x38-500), a number of sheets were coated at the predetermined doctor setting, and allowed to air-dry. After drying the sheets were given a low finish on a commercial supercalender under identical operating conditions.

The bonding of the coating to the rawstock was measured by means of the Dennison Paper Testing Waxes No. 120A Series.

Samples of coated paper were proof-pressed on a commercial platen press using a regular halftone ink.

The degree of ink receptivity was meas-

(1) Cellulose Products Division, The Dow Chemical Company, Midland, Michigan. (2) Trade Mark Reg. U. S. Pat. Off. (3) Absolute viscosity at 30 C., or a 2 per cent aqueous solution.

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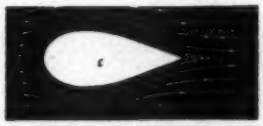

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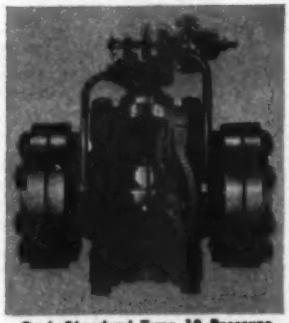

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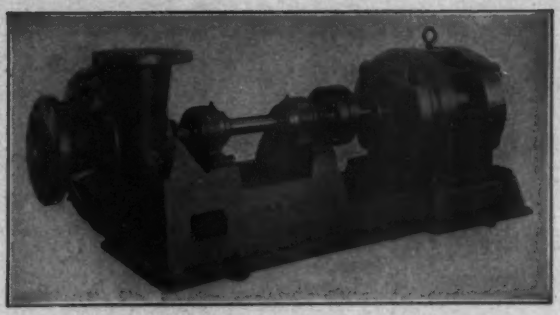

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ured by means of the K and N ink test following the standard procedure (Kirkpatrick, W. A., *Paper Trade J.* 109, No. 12, 156-8, 1939; *Tech. Assoc. Papers* 22; 322-4, June 1939) of applying an excess of ink to the coated sheets and allowing this to remain for a period of exactly two minutes. At the end of this time the excess ink was removed with a clean cloth and the color intensity of the stain was measured by means of the General Electric Recording Spectrophotometer (Lee, E. S., *Paper Trade J.*, 110, No. 26, 101-4, 1940).

The opacity of the coated sheets was determined according to the TAPPI standard procedure T-425M.

The brightness of the coated sheets was measured on the Higgins Photoelectric Colorimeter (Instrumentation Studies XXVII, *Paper Trade J.* 112, No. 1, 13-22, 1941) employing a standard magnesium carbonate block and a No. 49 Wratten filter having a 400-500 millimicron wave length range.

The gloss of the calendered sheets was measured with a Bauch and Lomb Glossmeter (Kress, Otto and Morgan, H. W., *Paper Trade J.*, 100, No. 26, 41-2, 1935; *Tech. Assoc. Papers* 18; 409-410, June, 1935).

The Williams Smoothness Tester (Williams, F. M., *Paper Trade J.* 98, No. 15, 41-43, 1934) was employed to determine the physical flatness of the coated sheets.

In briefly summarizing the properties imparted by Methocel to pigment coatings as compared with casein, the following is indicated:

Methocel exhibits a higher bonding strength and a greater resistance to ink penetration while producing a more flexible coating.

Methocel effects a reduction in gloss, opacity and to a slight extent, brightness.

There appeared to be no appreciable difference in smoothness.

The use of Methocel for incorporation in a coating color is indicated primarily where the particular property improvements desired are high resistance to ink, varnish or lacquer and increased coating flexibility.

The study is being continued with blends of Methocel and casein. The blends to be studied will consist mainly of casein with small amounts of Methocel. Before this study could be undertaken, however, it was necessary first to fully evaluate each adhesive separately. The results of this further investigation will be reported at a later date.

Acknowledgment: The authors wish to express appreciation to the Bryant Paper Company, Kalamazoo, Michigan, for its generous favor in calendering numerous test samples.

Pulping Loblolly Pine Heartwood with Calcium, Magnesium, and Sodium Base Sulphite Liquors

J. N. McGOVERN[1] and G. H. CHIDESTER[2]

Since the heartwood of southern pine is not satisfactorily reduced to pulp by the sulphite process, some modification of the usual procedure is necessary to render the process adaptable to heart-containing material. Previous work at the Forest Products Laboratory has shown that the use of cooking liquors strong in sulphur dioxide and cooking schedules employing low temperatures and long times aided the pulping of this material (*Paper Trade Journal* 110, 7:39-42, March 7, 1940). Sodium base liquors have also been found to be fairly satisfactory for pulping well-seasoned southern pine heartwood as well as other refractory woods (*American Pulp and Paper Mill Superintendents Association. Year Book and Program* 1939:274-278).

The objects in this work were: (1) to obtain more data using calcium and sodium base liquors on other samples of southern pine heartwood, both seasoned and unseasoned; and (2) to determine the effects of magnesium base liquors on these woods. The present report, therefore, gives comparative results with calcium, magnesium, and sodium base sulphite liquors in cooking green and seasoned loblolly pine heartwood.

The loblolly pine *(Pinus taeda)* used in these experiments was obtained from Crossett, Arkansas, and consisted of the first three 8-foot logs from one tree. The unbarked logs with their ends painted were shipped to the Laboratory shortly after cutting. The sapwood was removed from the upper two logs about 1½ months after cutting, and the remaining heartwood stored for approximately 6 months in a room kept at 40 Fahr. and 95 per cent relative humidity. Five-eighths-inch chips were prepared from the wood after the storage period. A portion of the chips was pulped immediately and the remainder air seasoned for 3½ months on wire screens before being pulped.

The calcium, magnesium, and sodium base cooking liquors were prepared, respectively, by adding a water suspension of hydrated lime or magnesium oxide, or a solution of sodium hydroxide to a sulphurous acid solution and then concentrating this liquor to the proper total sulphur dioxide strength by further addition of sulphur dioxide from a cylinder. The acid in all cases contained 7.0 per cent total sulphur dioxide with 1.35 per cent combined.

The digestions were made in an alloy-clad autoclave provided with a steam jacket for indirect heating, and having a capacity of 1.5 cubic feet. The digester charge was 10 pounds of chips on an oven-dry basis and an average of 8.1 gallons of acid for the digestions of the chips from the stored wood and 8.7 gallons for those of the seasoned chips.

The temperature schedule employed in making these digestions was as follows:

	Hours
Time to 110 C.	2
Time at 110 C.	2
Time from 110 to 130 C.	6
Time at 130 C.	5.9 to 8.4

The maximum pressure in all digestions was 75 pounds per square inch.

All digestions were carried out until the point was reached where the base was completely exhausted. This was determined by the appearance of the liquor and the Sander test for combined sulphur dioxide.

(1) Assistant Technologist and (2) Senior Engineer, Forest Products Laboratory, U. S. Department of Agriculture, maintained at Madison, Wisconsin, in co-operation with the University of Wisconsin.

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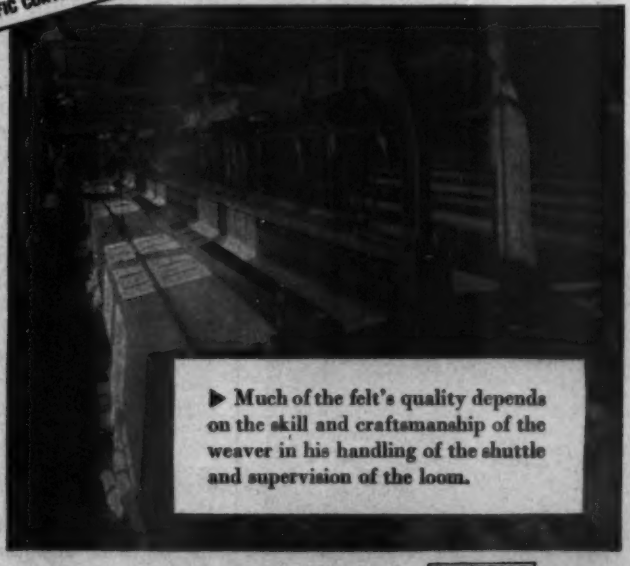

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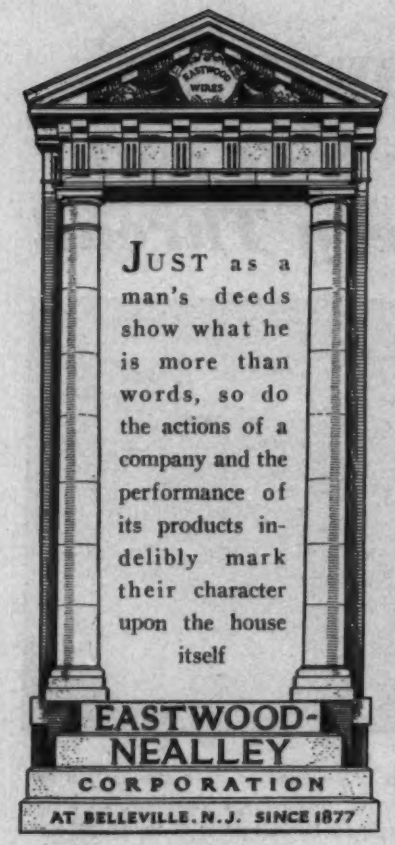
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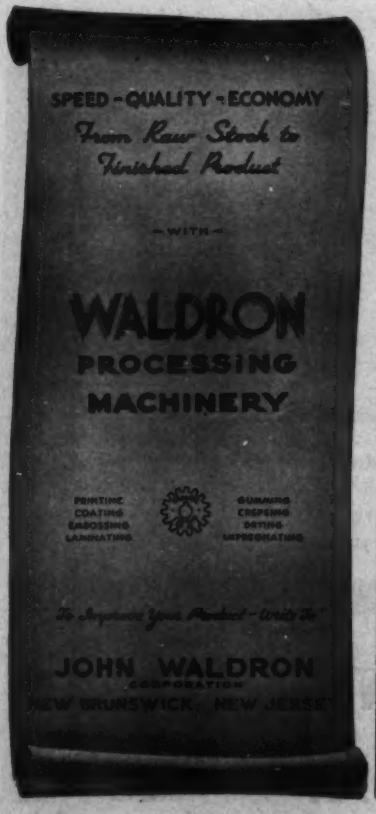

The cooked chips were broken up with an electric stirrer and screened through a small flat screen with 0.012-inch openings.

The bleach requirements of the pulp were determined by a permanganate number method and a single-stage hypochlorite test. The strength values for the pulps were determined from test beater runs. The chemical analyses of the pulps, as well as all the tests, were carried out by standard Forest Products Laboratory methods.

When the chips from the stored wood and the seasoned chips were pulped with calcium, magnesium, and sodium base sulphite liquors, a very definite cation effect was noted.

Since all digestions were considered ended only when the appearance of the liquor and its combined sulphur dioxide test indicated the exhaustion of the bisulphite, considerable differences in pulping time resulted from the use of cooking liquors containing the various cations. In fact, under the mild digestion conditions employed, about two hours more were required to attain the desired end point with the magnesium than with the calcium base liquor, and 0.4 hour additional was needed for the sodium in comparison with the magnesium base liquor for both green and seasoned wood.

A considerable reduction in amount of undefibered material or screenings was experienced when magnesium or sodium were substituted for calcium in the cooking liquor. The lowest screenings values—and they indicated practically complete pulping of both samples of loblolly pine heartwood—were realized in the sodium base digestions.

The screened yields of pulp from the chips from the stored wood increased in proceeding from calcium to magnesium to sodium base liquors. This showed that the gain in screened pulp at the expense of screenings exceeded that lost by producing more purified pulp. The screened yields from the seasoned chips did not vary greatly. This indicated that the conversion of screenings to screened pulp was balanced by the reduction in screened yield caused by greater purification.

The trend of more complete pulping with change in cation in the cooking acid from calcium to magnesium to sodium was also shown by the pulp bleach requirements and unbleached colors, additional measures of pulping action. The calcium and magnesium base digestions yielded very hard pulps, that from the latter having a somewhat lower bleach requirement than the former. The sodium base digestions produced medium-bleaching pulps. The calcium and magnesium base pulps, although consistent in trend, differed much less in their bleach requirements than would be expected from the other factors.

The color (Ives blue factor) of the unbleached pulps improved appreciably with change from calcium to magnesium to sodium as the base in the cooking acid.

Only small differences were found in the strength values for the various pulps. On the whole, the pulps from the calcium base digestions were slightly inferior to the others. The magnesium and sodium base pulps had practically the same strength.

A regular increase in pulp purity was experienced when magnesium replaced calcium and, in turn, sodium replaced magnesium in the cooking acids. This enhanced pulp purity was indicated by the progressive increase in both alpha- and total cellulose contents and by the decrease in lignin and ash contents.

When chips from the stored wood were air seasoned for 3½ months, their pulping by the cooking liquors containing the various bases, as well as the pulps thereby produced, were altered. The seasoned chips in comparison with those unseasoned required a slightly longer time to reach the desired pulping end point, yielded lower amounts of screenings, and furnished pulps with lower bleach requirements, somewhat lower strengths, and slightly greater purification. In short, the seasoned chips were able to be somewhat more completely pulped than those from the stored wood under the conditions used.

The amount of screenings resulting from cooking the seasoned chips was substantially lower than from cooking the chips from the stored wood. This reduction was especially noticeable in the calcium base digestions where the chips from the stored wood had a high screenings figure.

The pulps from the seasoned chips had somewhat lower bleach requirements than those from the chips from the stored wood. This trend is in line with the results on pulping time and screening and yield, and indicates that more complete pulping is possible with the seasoned chips than with chips from the stored wood. The colors of the unbleached pulps were very little affected by the use of seasoned wood.

The pulps from the seasoned chips had, in general, lower strength factors than those from the stored wood. The folding endurance factors were exceptions to this trend, being slightly higher for the pulps from the seasoned chips.

While no difference was noted in the total cellulose contents of the various pulps from the seasoned chips in comparison with those from the stored wood, evidence of somewhat greater purity for the former was present in the form of higher alpha-cellulose and lower lignin contents.

An Investigation of Rosin Size Precipitation and Its Effect on the Sizing and Strength Properties of Paper

W. P. DOHNE[1] and C. E. LIBBY[2]

Rosin size precipitation was studied with particular reference to *p*H conditions and their effect on the sizing quality, physical strength, and stability of hand made papers.

High free rosin size employed in a beater furnish made up with fresh water gave satisfactory sizing up to a beater *p*H of 7.97 when sodium aluminate and alum were employed as the precipitating agents. The same size in a beater furnish containing recirculated white water gave satisfactory sizing up to a beater *p*H of 5.90 when precipitated with these same chemicals.

Low free rosin size employed in a beater furnish made up with fresh water gave hard

(1) Research Laboratories, Michigan Alkali Co., Wyandotte, Mich. (2) Professor of Pulp and Paper Manufacture, New York State College of Forestry, Syracuse, N. Y.

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FIG. 1

FIG. 2

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sized papers up to a beater *p*H of 8.50 when sodium aluminate and alum were employed as the precipitating agents. The same size in a beater furnish containing recirculated white water gave satisfactory sizing up to a beater *p*H of 6.00 when precipitated in the same manner.

The use of sodium aluminate in precipitating low free rosin size at a *p*H of 6.00 required definite ratios of aluminate and alum to obtain complete precipitation of the size. Simultaneously increasing the amounts of alum and aluminate, thereby bringing about a corresponding increase in alumina, produced no effect on the sizing quality of the manufactured papers.

High free rosin size required a minimum of 0.10 pound of alum per pound of size to produce good sizing effects. Additional quantities of alum caused a slight decrease in the sizing quality of the manufactured papers.

Low free rosin size required a minimum of 0.40 pound of alum per pound of size to produce good sizing resistance. Additional quantities of alum caused a slight increase in the sizing quality of the manufactured papers.

Sizing precipitated with combinations of sodium aluminate and alum imparted to paper appreciably greater bursting and folding strength and lesser tearing strength than did sizing precipitated with alum alone.

Papers containing aluminate precipitated size exhibited only very slight losses in physical strength when subjected to an accelerated aging test. Papers which had been sized with rosin and alum showed large losses in physical strength after similar treatment.

The accelerated aging test for loss of physical qualities resulted in progressive betterment of the size test even up to exposures of 150 hours. Both the aluminate and alum precipitated sizings increased in quality at an equal rate under this treatment.

Deterioration of sizing quality was studied by exposing samples of the sized papers to the action of ultraviolet light. Both the aluminate and alum precipitated sizings decreased in quality, the sizing precipitated at a low *p*H value showing deterioration more quickly than that prepared near neutrality, but thereafter proceeding to disintegrate at approximately equal rates as a result of the light treatment.

Healy (Healy, J. J. and Dyer, C. P., "Aluminate Size," *Paper Trade Journal*, 96, No. 12: 29-31, March 23, 1933, *Technical Association Papers*, Series 16, June, 1933) claims to have first formally introduced sodium aluminate to the paper trade as a chemical aid in sizing paper at the higher *p*H values at the annual meeting of the Technical Association of the Pulp and Paper Industry in February, 1933. It is known, however, that this compound was used for this purpose many years previous to this date for a patent was issued to DeCew (DeCew, U. S. 1,300,337, April 15, 1919) in 1919 in covering the use of aluminate in sizing applications.

Sodium aluminate contains aluminum in the negative instead of in the positive radical. Theoretically, based on respective Na_2O and SO_3 content, one pound of aluminate will neutralize 1.23 pounds of alum and there will be provided alumina equivalent to 4.47 pounds of alum. On the basis of alumina content, a pound of sodium aluminate is equivalent to somewhat more than 3 pounds of alum. Used in conjunction with alum, sodium aluminate provides additional alumina which helps directly in cementing the rosin to the fiber and simultaneously provides a convenient method to control *p*H conditions, which is an important function in the manufacture of many grades of paper.

In order to insure the reproducibility of results and to eliminate as many of the variables as possible, pure abietic acid, dry rosin size, high grade alpha pulp, c.p. aluminum sulphate, gelatin, and sodium aluminate were used throughout this investigation. The pulp used was Solka No. 1 alpha, obtained from the Brown Company, Berlin, New Hampshire. Pure abietic acid crystals were prepared from rosin. The rosin was heated under reflux with glacial acetic acid, allowed to crystallize, washed and then recrystallized from alcohol until the acid number approached the theoretical value (i.e., 185.6).

The methods of high free rosin size manufacture, pulp processing, sheet formation, pressing and drying were similar to those developed by Dennett and Libby (Dennett, F., and Libby, C. E., "The Effect of Particle Size on the Efficiency of a Rosin Suspension as Measured by the Retention

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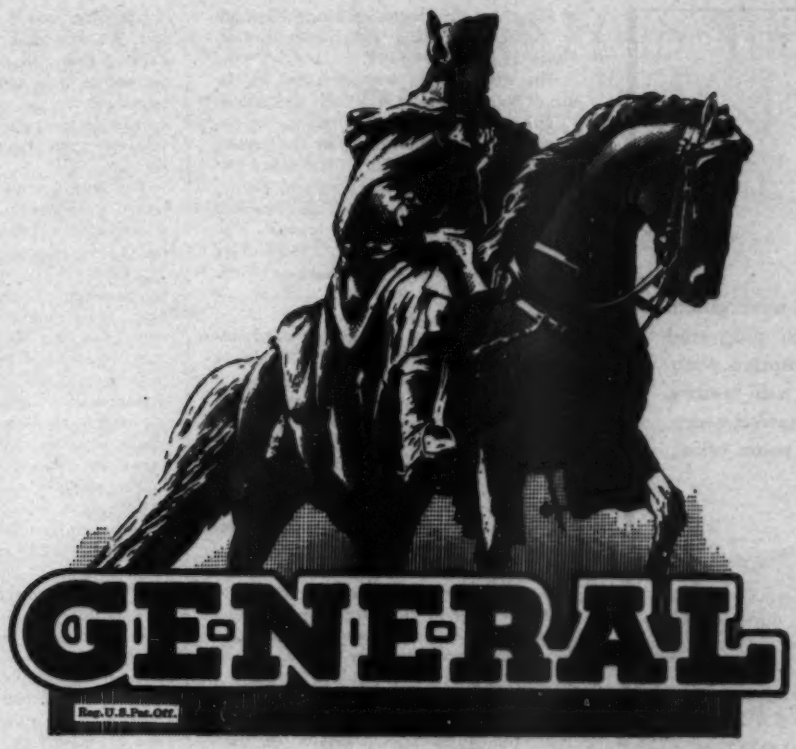

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WAUSAU WISCONSIN

CELLULOSE PURIFICATION

of Rosin and the Degree of Sizing Imparted to Paper," *Technical Association Papers*, Series 23,617-623, 1940).

The sizing values were obtained by the use of both the Valley and Cobb size testers.

The amount of rosin retained in the finished papers was determined by the method of Launer (Laurner, H. F., "Simplified Determination of Resin in Paper and Pulps" National Bureau of Standards Research Paper, RP 937, *Paper Trade Journal*, Vol. 24, No. 21, 37-41, May 27, 1937) using an extraction solution consisting of 4 ml. of concentrated hydrochloric acid to one liter of ethyl alcohol.

This investigation has demonstrated that the composition of a rosin size should be considered in determining the method of precipitation to secure optimum sizing effects. Excessive acidity appears to impair the quality of high free rosin sizes and improve the quality of neutral sizes. However, these facts must be considered with due regard to machine operating conditions.

The nature of the white water system has an important bearing on the efficiency of any sizing process. Evidence produced by this investigation leads to the conclusion that deterioration of sizing will take place more quickly in a closed white water system when sizing near neutrality than under conditions of considerable acidity.

Highly saponified sizes require more alumina for satisfactory sizing results than high free rosin sizes. Results of these studies indicate an alum requirement approximately four times as great for a 10 per cent free rosin size as for a100 per cent free rosin size. Since a size of this high free rosin content is never attained in commercial practice, a smaller differential in the alum requirement for commercial sizes may be expected.

This investigation confirmed the findings of previous investigators that papers manufactured under conditions of low acidity are considerably stronger in physical properties and more resistant to the deteriorating effects of aging than are papers made at the lower p*H* values.

A result of this research was the development of a laboratory method for determining the stability of rosin sized papers and the development of data indicating greater resistance to aging for paper sizing which had been precipitated at higher p*H* values in comparison with sizing precipitated under conditions of high acidity.

Further Studies on the Desulphonation of Calcium Lignosulphonate. The Desulphonation of Calcium Lignosulphonate with Lime.

I. A. PEARL[2], A. BAILEY[1], and H. K. BENSON[1]

The treatment of sulphite waste liquor with calcium hydroxide was reported by Grafe (V. Grafe, *Monatsh.*, 25, 1001, 1904) in his first investigation of vanillin production from waste liquor by alkaline treatment. He heated the waste liquor with lime at 180 C.

(1) Chemistry Laboratory of the University of Washington.
(2) Present address — Institute of Paper Chemistry, Appleton, Wisconsin.

Kürschner and Schramik (K. Kürschner and W. Schramik, *Tech. Chem. Papier-Zellstoff-Fabr.*, 28, 66, 1931) have reported the use of lime and sodium sulphate as a substitute for the more costly sodium hydroxide in the preparation of vanillin from sulphite waste liquor when heated under pressure.

The lime treatment of sulphite waste of liquor at relatively low temperatures and at atmospheric pressure, the Howard Process (G. C. Howard, Ind. and Eng. Chem., 22, 1184, 1930), results in very little desulphonation of the calcium lignosulphonate. Howard (G. C. Howard, U. S. Patents 1,848,292, March 8, 1932; 1,924,361, Aug. 29, 1933; 1,981,176, Nov. 20, 1934) has reported the preparation of partially desulphonated lignosulphonic acids which are useful as fillers and pigments by the steam pressure cooking of sulphite waste liquor with an excess of caustic lime.

The sulphite waste liquor used in this investigation was of hemlock origin, and was kindly furnished by the Puget Sound Pulp and Timber Company of Bellingham, Washington.

Calcium lignosulphonate was prepared by carefully precipitating the inorganic portion with lime, separating the inorganic fraction, and fractionally precipitating the calcium lignosulphonate from the aqueous solution by the use of ethanol. The largest fraction of the sulphonate was further purified by dissolving in water and repeating the precipitation processes. This purified calcium lignosulphonate was used in all the following experiments. It had the following analysis: ash, 8.99 per cent; sulphur, 6.71 per cent; methoxyl, 7.93 per cent (ash-free basis, 8.73 per cent).

All desulphonations were performed in the same manner. Fifteen grams of finely powdered lime was added to 100 grams of water in a 150 cubic centimeter iron crucible and the mixture well mixed. Fifteen grams of finely powdered calcium lignosulphonate was then added gradually with constant stirring. The crucible was sealed, thoroughly shaken, and then placed in an oil bath at the temperature and for the length of time of the experiment. At the end of the reaction time the crucible was removed from the oil bath and allowed to cool.

After cooling, the crucible was opened and the reaction mixture well mixed. The contents consisted of a mixture of calcium lignate (calcium salt of desulphonated lignin), calcium sulphate, calcium sulphite, calcium lignosulphonate in various degrees of desulphonation, excess calcium oxide and hydroxide, and smaller amounts of organic by-products such as vanillin, etc. The relative amount of each component is dependent upon the conditions of the experiment. Hydrochloric acid was added in sufficient quantity to give an excess after neutralizing the excess lime and the calcium salts of the organic compounds. A large part of the crucible contents dissolved, and the desulphonated lignin was precipitated as a light yellow flocculent precipitate. The lignin precipitate and acid solution mixture was transferred to a beaker, and the precipitate allowed to settle. The solution was decanted from the lignin which was then stirred well with distilled water, and the resulting mixture centrifuged. Decantation,

stirring with distilled water, and centrifuging was repeated three times. The lignin was then transferred to a Büchner funnel, thoroughly washed with distilled water, and then placed in a cellophane bag and dialyzed for a period of six weeks. The dialyzed material was washed into a beaker, allowed to settle, decanted through a Büchner funnel, and washed with distilled water. The thoroughly washed precipitate was air dried at 80 C.

The results of desulphonation experiments indicate that, for a calcium lignosulphonate-lime ratio of 1:1 and a lime concentration of 10 to 15 per cent, complete cleavage of sulphur from calcium lignosulphonate takes places at temperatures between 175 and 200 C. and reaction times of 2 to 4 hours.

At lower temperatures the low ash values and higher sulphur values indicate that the calcium lignosulphonate is evidently partially desulphonated to a degree which changes its solubility in dilute hydrochloric acid and thereby giving a partially sulphonated lignosulphonic acid.

Lime desulphonation of calcium lignosulphonate results in much higher yields of desulphonated lignin than does the sodium hydroxide desulphonation reported in earlier paper (I. A. Pearl and H. K. Benson, *Paper Trade J.*, 111, No. 19, T. S., 237, 1940).

Atmospheric pressure desulphonations with lime result in little desulphonation and very low yields.

The properties of the desulphonated lignins obtained by lime treatment of calcium lignosulphonate will be studied.

Holocellulose[1] Research in Co-operation with the Technical Association of the Pulp and Paper Industry

GEORGE J. HAJNY[2] and GEORGE J. RITTER[3]

Research on holocellulose has been conducted at the Forest Products Laboratory during the last five years in co-operation with the Technical Association of the Pulp and Paper Industry.

Since the results of the first 4 years have been published, they will be discussed briefly, whereas those of the current year will be discussed more fully.

Work during the first year of co-operation was confined to the development of an improved method for the determination of holocellulose and for hydrolyzed holocellulose which is comparable to Cross and Bevan cellulose. The time required for the holocellulose determination by the improved method is about 2.5 hours as compared with 2.5 days by the method used previously (Ritter, Geo. J. and Kurth, E. F., *Ind. Eng. Chem.*, 25:1250, 1933). The method has been published in the *Paper Trade Journal* (Van Beckum, W. G. and Ritter, Geo. J., *Paper Trade J.*, 105, 18:127, 1937).

(1) Holocellulose as employed in this report is composed of the hemicellulose and the cellulose in wood.

(2) Student Assistant and (3) Senior Chemist, Forest Products Laboratory, U. S. Department of Agriculture, Maintained at Madison, Wisconsin, in co-operation with the University of Wisconsin.

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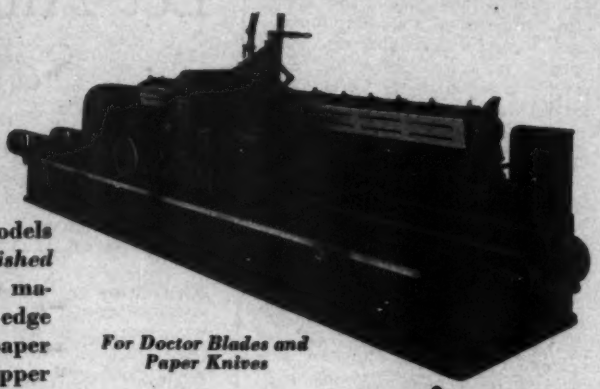

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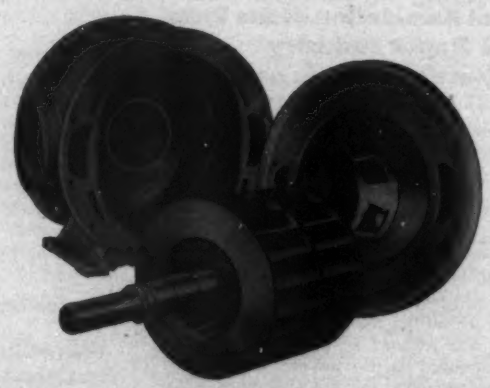

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The improved method for the holocellulose determination was applied to sawdust from white spruce, red spruce, jack pine, balsam fir, eastern hemlock, aspen, white oak, maple, and willow.

The method for the preparing of hydrolyzed holocellulose which is comparable to Cross and Bevan cellulose, involves the hydrolysis of holocellulose for two hours with 1.3 per cent sulphuric acid at the temperature of the boiling water bath. The method has also been published (Van Beckum, W. G. and Ritter, Geo. J., *Paper Trade J.*, 105, 18:127, 1937).

During the second year of co-operation the composition of the holocellulose, hydrolyzed holocellulose, and Cross and Bevan cellulose was determined for comparison. The three cellulose materials were prepared from aspen, balsam fir, eastern hemlock, jack pine, red spruce, and white spruce. They were then analyzed according to the methods described in the citations for each of the following constituents and substituent groups: alpha-cellulose (American Chemical Society, *Ind. Eng. Chem.*, anal. ed., 1:52, 1929), pentosans (Tollen's Method, Bray, M. W., *Paper Trade J.*, 87:39, 1928), uronic acid (Dickson, A. D., Otterson, H., and Turk, K. P., *Jour. Amer. Chem. Soc.*, 52:775, 1930), acetyl (Clark, E. P., *Ind. Eng. Chem.*, anal. ed., 8:487, 1936), methoxyl (Clark, E. P., *J. Soc. Off. Agric. Chemists*, 15:136, 1932). The holocellulose and Cross and Bevan cellulose were also analyzed for lignin (Barbour, J. H. and Ritter, Geo. J., *Ind. Eng. Chem.*, anal. ed. 7, 4:238, 1935) although none was found.

The fact that the holocellulose contains, on the basis of the wood, more alpha-cellulose than does hydrolyzed holocellulose or Cross and Bevan cellulose can be explained on the basis that the holocellulose had undergone less degradation than the other two cellulosic materials. In order to test the soundness of this explanation, viscosity measurements in cuprammonium solution (TAPPI Tentative Off. Stand. Method. *Paper Trade J.*, 94, 19:38, 1932, correlated Dec. 15, 1937, T206M-37) were made on each of the three materials and also on their alpha-celluloses.

Experiments during the fourth year of the co-operative research were directed (a) to the preparation of pulps from white spruce Asplund fiber (The white spruce Asplund fiber was kindly furnished by the Wood Conversion Company of Cloquet, Minnesota), and (b) to the properties of the pulps and of the test sheets made from the pulps.

Holocellulose was prepared in 1-pound batches according to the procedure of Van Beckum and Ritter (Van Beckum, W. G. and Ritter, Geo. J., *Paper Trade J.*, 105, 18:127, 1937) from white spruce Asplund fiber. It constituted 68.0 per cent of the fiber, had an alpha-cellulose content of 52.0 per cent on the basis of the fiber, and a viscosity in cuprammonium solution (TAPPI Tentative Off. Stand. Method. *Paper Trade J.*, 94, 19:38, 1932, correlated Dec. 15, 1937, T206M-37) of 40.4 centipoises.

A pulp consisting of 59.4 per cent of the Asplund fiber was prepared by extracting the holocellulose with 5.0 per cent

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sodium hydroxide solution at the temperature of the boiling water bath for 2 hours.

A portion of the unbleached pulp was bleached to 87 parts blue (Ives) by means of 0.5 per cent bleaching powder having 35.0 per cent available chlorine. It is 58.1 per cent of the Asplund fiber, has a viscosity of 37.4 centipoises, and contains 52.0 per cent of alpha-cellulose on the basis of the Asplund fiber.

The physical properties of the two pulps and of test sheets made from them after various periods of treatment in a 1.5-pound beater were determined by standard TAPPI methods. In most instances the test sheets made from the holocellulose are superior to those made from the bleached sulphite pulp which is only 43.0 per cent of the wood.

Some preliminary work was done during the year of 1939-40 on semichemical pulp as a source for refined pulps in high yields. When the moist semi-chemical pulp was treated with gaseous chlorine, followed by an extraction with alcohol-monoethanolamine the refined pulp yield was approximately 65 per cent of the wood. When the semi-chemical pulp was treated with chlorine water, followed by an extraction with aqueous 2 per cent sodium sulphite solution the refined pulp yield was approximately 60 per cent of the wood.

Semi-chemical pulps were prepared as sources for the refined pulps from aspen, shortleaf pine, and white spruce by the Division of Pulp and Paper of this laboratory. Experiments were made to determine the amount of chemical necessary for refining these semi-chemical pulps.

The weight of chlorine taken up when wood is suspended in chlorine water is approximately 1⅓ times the weight of the lignin in the wood. A ton of aspen semi-chemical pulp having a lignin content of 13.1 per cent would contain 262 pounds of lignin. The chlorine requirement for chlorination would be 349 pounds ($262 \times 1\frac{1}{3} = 349$). At 2 cents a pound the cost of chlorine would be $6.98.

The chemical-base requirement for removing the chlorinated lignin from the semi-chemical pulp was considered on the basis of (1) concentration of base in the liquor, and (2) ratio of liquor to the chlorinated semi-chemical pulp.

Chemicals used for dissolving the chlorinated lignin in the Cross and Bevan method for cellulose is at least five times the weight of the wood sample. It was found in the present study that satisfactory results could be obtained when the amount of chemical was reduced to 10 per cent of the weight of the lignin in the semi-chemical pulp sample. Thus a ton of aspen semi-chemical having 13.1 per cent lignin would contain 262 pounds of lignin. It would require 26.2 pounds of chemical base, such as sodium sulphite, or sodium hydroxide for the removal of the chlorinated lignin. At 2 cents a pound the chemical base would cost 53 cents.

The ratio of lignin chloride solvent to the semi-chemical pulp was reduced from 50/1 to 12/1. Semi-chemical pulps, properly chlorinated, which can be done in one step, and extracted according to the procedure described below, can easily be bleached to an acceptable whiteness by means of calcium hypochlorite.

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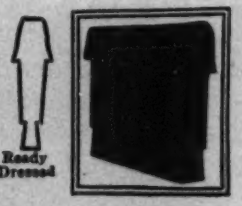

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The semi-chemical pulp was suspended in approximately a 3 per cent consistency in chlorine water while being stirred at room temperature. When the pulp had turned to a pinkish yellow color it was drained on a screen and washed free of chlorine water. During constant stirring the washed chlorinated pulp was extracted at 80 C. for about 40 minutes with approximately 12 parts by weight of an aqueous solution of sodium hydroxide or sodium sulphite solution or with 12 parts of an alcohol-monoethanolamine solution to 1 part of pulp. The amount of base in either the aqueous or the alcoholic solution was equivalent to approximately 10 per cent of the weight of the lignin in the pulp sample. The extracted pulp was then drained on a screen and washed with water until neutral. It was then bleached with approximately 1 per cent of available chlorine applied in the form of calcium hypochlorite and washed.

The cost of refining a semi-chemical pulp according to the preceding procedure will depend largely upon its lignin content.

Yields of refined pulp prepared from the semi-chemical pulps range from 72.9 to 83.5 per cent. On the basis of the wood they range from 59.5 to 63.0 per cent.

The alpha-cellulose content of the refined pulp ranges from 78.0 to 82.9 per cent. The remainder of the refined pulp may be considered hemicellulose. The alpha-cellulose content is from 46.4 to 52.1 per cent on the basis of the wood, being lowest in shortleaf pine. These alpha-cellulose values on the basis of the wood are considerably higher than the corresponding values for alpha-cellulose from commercial pulps.

The pentosan value of the refined aspen pulp is 19.2 per cent whereas those for the softwood refined pulps are from 9.9 to 11.6 per cent. They are approximately 0.5 of the hemicellulose values except in the case of the aspen refined pulp in which out of 20.8 parts of hemicellulose there are 19.2 parts of pentosans.

Viscosity values of the alpha-celluloses vary from 40.9 to 112 centipoises.

Refined aspen pulp was converted to a high-alpha pulp which was tested for its suitability for cellulose derivatives. The high-alpha pulp was 49 per cent of the wood, had an alpha-cellulose content of 98.7 per cent, and a viscosity in cuprammonium solution of 112 centipoises according to the standard TAPPI method. Tests by a commercial laboratory showed that the pulp acetylated readily.

Amounts of chemicals and conditions employed for preparing the high-alpha pulp were similar to those prescribed for the determination of alpha-cellulose. They would, undoubtedly, be too costly for commercial operations. The development of an economical procedure for the production of high-alpha pulp from refined semi-chemical pulp has been reserved for next year.

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travel controls have been lowered, and a protective metal canopy provided. Specifications for the tractor include: A frame of all-welded steel plate construction; semi-elliptic, front and rear springs; internal expanding type brakes; snap action mechanical contactor controller rubber cushioned, high overload capacity motor; and drive axle with double reduction spiral level and spur gear, ball bearing mounted throughout.

Skin Protection Against Acids and Alkalis

The Milburn Co., Detroit, Mich., has introduced an ointment, designated as Ply No. 6, for thin application over exposed parts of the skin as protection against acid and caustic compounds in both dry and aqueous form. Stated by the manufacturer to be harmless to the skin, an application of the ointment is removed at the end of each working period with ordinary soap and warm water.

Water Column Try-Cock

Yarnall-Waring Co., Chestnut Hill, Philadelphia, has announced a try-cock, the Y.H.D. *(Yarway Heavy-Duty)*, for pressures up to 1500 lb. Body and stem are of tobin bronze for pressures up to 600 lb.; of stainless steel, for 600 to 1500 lb. Stainless steel also is used for the shanks, as well as for the needle valve and seat, the latter two parts being heat treated and both of which are reversible and renewable. To avoid interference of operating chains, the operating lever on upper try-cock is off-set outward; lever on center try-cock is straight; and lever on lower try-cock is off-set inward. This heavy-duty try-cock is also made in weighted lever style with single operating chain.

25 hp. Centrifugal Pump and Motor Unit

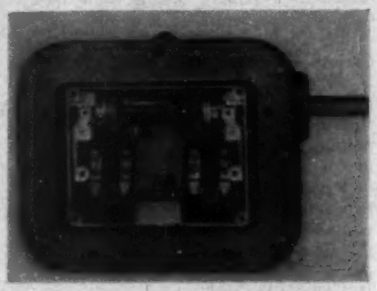
Allis-Chalmers Mfg. Co., Milwaukee, Wis., has added a 25-horsepower unit to its line of Electrifugal single-unit pumps. With both motor and pump on one shaft and in one housing, the manufacturer cites the following advantages for it: 33 per cent saving in space, only three section-fits; more perfect shaft alignment, less vibration, less wear, easier installation, and lower pumping costs.

Air-Operated Flow Controller

Fisher & Porter Co., 46 County Line Rd., Hatboro, Pa., has announced an air-operated flow controller for automatically controlling flow rates of liquids, vapors and gases in piping system. The controller, designated as the Rotamatic combines a pneumatically-operated controller, remote indicator or recorder, with a standard type of direct-indicating rotameter. The rotameter float position is transmitted to the recorder pen arm through the use of a self-balanced induction bridge. When the recorder pen arm is not at the same position as the control index arm, a flapper changes the air pressure within a bellows-type control system. The changed air pressure opens or closes a diaphragm motor control valve in the flow line to bring the rate of flow back to the desired control point. The controller, according to the manufacturer, is especially valuable for measuring and controlling flows of viscous and corrosive fluids.

Limit Switches

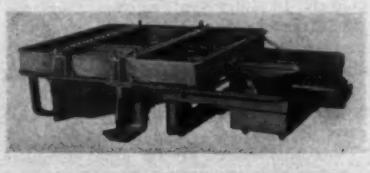
The General Electric Co., Schenectady, N. Y., has announced the addition of two new forms to its line of CR9441-C2 rotating-type limit switches. One form is for Class 1, group D hazardous locations; the other, for applications requiring water-



tightness. Both switches are housed in heavy, flanged, cast-iron enclosures, the switch mechanism in each case being adjusted to operate contacts between a minimum of one-half turn of the driving shaft and a maximum of 120 turns, indefinite overtraveling not harming the mechanism. Double-break, fine-silver contacts clean themselves by opening and closing with a rocking motion. New contact tips can be installed with a screwdriver. One double-break contact is located at each end of the travel, and can be made normally closed or normally opened without additional parts. A ¾-in. conduit entrance and roomy box make for easy wiring.

Switch for Overhead Materials Handling System

A new electrically-operated track switch for use on cab-operated, gravity, or automatic dispatch overhead materials handling systems has been announced by Cleveland



Tramrail, Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio. This development, known as a motor-driven Type H Switch, enables the tramrail operator to pre-set the switch at some distance ahead while traveling. Likewise, indexes on gravity or automatic dispatch carriers may be set to actuate trippers which will cause one or several switches to take the positions desired. The switch is of steel welded construction.

Corrosion-Resisting Pumps

The Duriron Co., Inc., Dayton, Ohio, has announced a new series of corrosion-resisting pumps in which it is possible to get 480 combinations of alloys, types and sizes with heads and capacities to meet practically any requirement. Designated as

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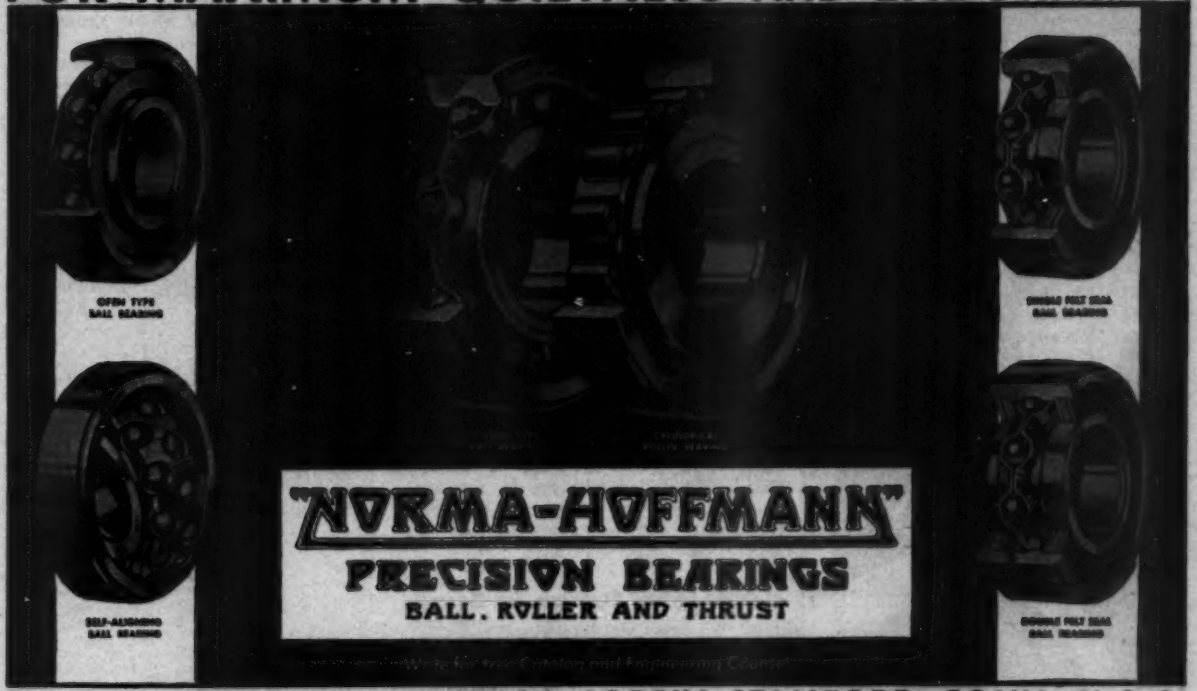

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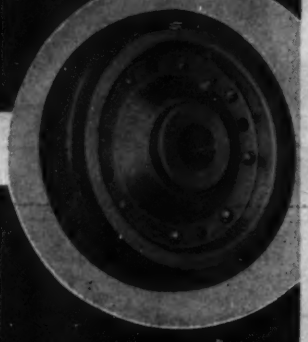

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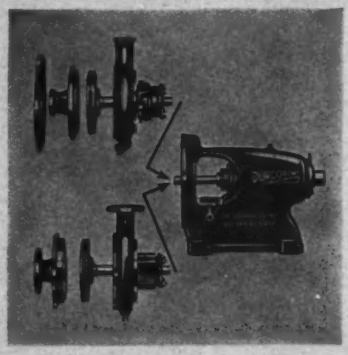
Durcopumps, the series has incorporated a feature of design which permits the conversion of a Duriron or Durichlon pump to a stainless steel pump by substituting only wet-end parts, the exchange being made without disturbing the pump setting. Other



features of the series include the interchangeability of newly designed opened and closed impellers with negative pressure on the stuffing box; oversize ball bearings throughout, and microadjustment of impeller.

Condensate Return Systems

M. W. Acker Organization, Inc., Cleveland, has announced both a single and a dual system for the automatic handling of condensate return and make-up water to

boilers. The single system, for pressures up to 250 lb., is actuated by a mercoid switch at the water column. Make-up water is admitted to a certified A. S. M. E. receiver tank by float-operated valve when condensate reaches a predetermined low level or is insufficient to satisfy the needs of boiler. The dual system handles both high and low pressure condensate and make-up water automatically. The systems include controls, motors, and pumps.

Viscosity and Specific Gravity Recorder

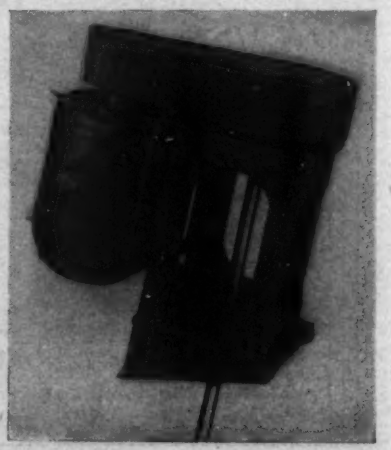
Petroleum Instrument Corporation, 738 East 3rd Street, Los Angeles, Calif., has announced the development of a continuous viscosity and specific gravity recorder. In the operation of this recorder, a smooth cylindrical solid metallic rotor is kept revolving at a constant speed of approximately 250 r.p.m. by a small synchronous motor. Turning inside a cage containing six stationary blades, the rotor shears the liquid, in which the base of the instrument is submerged, between its surface and the vanes, thus exerting a torque against the motor that is proportionate to the liquid viscosity, this torque being transmitted as the viscosity measurement to the recording dial and registered automatically on the chart.

The rotor is suspended on a weighing mechanism so that the buoyant force of the liquid, which is proportional to the specific gravity, also is transmitted to the recording dial in terms of specific gravity.

The instrument operates on 110 volt a.c. current; records on a 12 in. 24 hr. chart; is 5 ft. high; and weighs (with bracket) 60 lb.

V-Belt Drive for Top-Entering Mixers

Mixing Equipment Co., Rochester, N. Y., has announced a v-belt drive for top-entering propeller-type mixers for use over open tanks, closed tanks, pressure or vacuum vessels, or for attachment to standard size nozzles. The speed of a unit can be



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International Water Supply, Ltd.	London, Ont.

changed by changing the sheave and pulleys or a variable speed pulley can be provided on the motor. Likewise, the drive can be furnished with electrically conducting belts to do away with danger from static, or with oil resisting belts, where necessary. The motor for the drive can be standard, semi-enclosed, drip-proof, or totally enclosed, air jacketed or explosion proof. The unit is available in sizes from 1 to 25 hp.

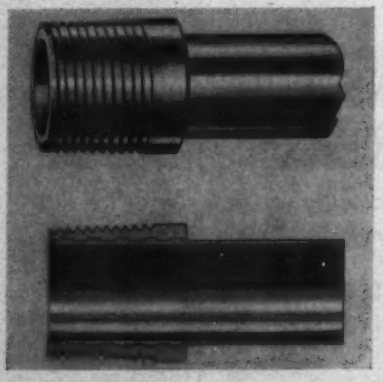
Leather Work Shoes with Non-Slip Soles

A line of leather work shoes with patented non-slip rubber soles has been announced by the Sperry Shoe Co., 15 Main

St., Beacon Falls, Conn. The line includes a 16 in. all black shoe with steel safety toe cap, an all black oxford with safety toe cap, a 6 in. black shoe with plain toe, and an all black oxford with plain toe.

New Type of Pipe Joint

Tri-Clover Machine Co., Kenosha, Wis., is offering a pipe joint which permits the use of thin wall tubing in connection with standard iron pipe size fittings of all kinds. This joint, known as the *Wallace Joint*, consists of a special threading and enlarging ferrule. In making a joint, the tube is expanded within the ferrule with a hand



operated expander. The joint can be furnished either attached permanently to the tubing or furnished separately to be attached by the customer. By using tubing, according to the manufacturer, exclusive licensee under the Wallace Joint patent, there is a resultant saving of approximately 65 per cent in material and without any loss of effectiveness.

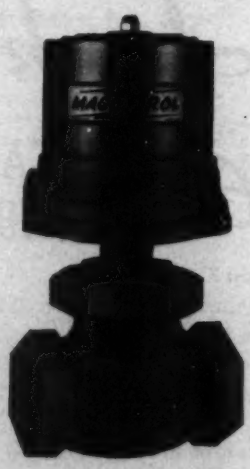
Drum and Barrel Truck

A hand truck for the handling of metal drums or barrels with a capacity up to 600 lb. and designated as the *Little Giant* model,

has been announced by the Ernst Magic Carrier Sales Co., 1456 Jefferson Ave., Buffalo, N. Y. Incorporated into the design of the truck are such safety features as a self-balancing three-wheel arrangement and a simple lifting device.

Flow Alarm

Fred H. Schaub Engineering Co., Automatic Control Div., 325 W. Huron St., Chicago, has announced a flow alarm device for water, oil, gas, or air line service applications. The alarm consists of a full-ported globe valve body to which is attached a magnetic switching arrangement. Units are available in a range of sizes up to 4 in. Installation can be made any place



where an ordinary check valve will operate, the standard unit being designed so that it does not give an alarm until the flow has dropped to approximately 10 per cent of the maximum flow for a given pressure. Special units can be built to give an alarm at any predetermined rate of flow less than maximum.

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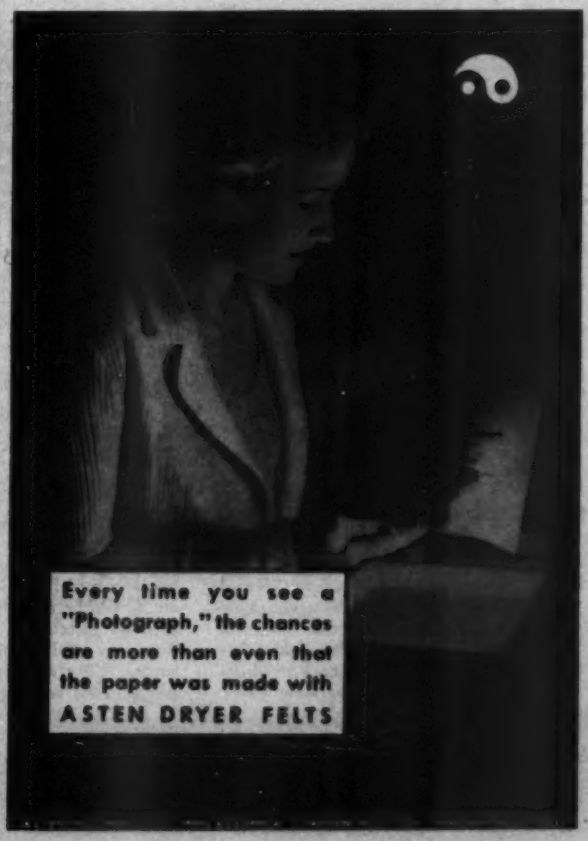

TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Plastic Masses from Lignin

This is a descriptive article referring to the recent work on lignin-phenol-formaldehyde plastics and other similar products. The researches of Crepaz and Bertolini of Padua and of Howard of the U. S. A. are referred to briefly. Anon. Wochbl. Papierfabr. 72, No. 23 335-6 (1941).

Second Growth and Alpha-Cellulose Production

The second growth forests of the North Central States of the U. S. A. furnish a potential raw material which is now going largely to waste. The authors working at the University of Minnesota, refer to studies on aspen wood, the chips of which are steeped in very dilute nitric acid and then heated to fairly elevated temperatures. Pulping and purification are described, and it was shown that a pulp would be obtained with an alpha content of over 98 per cent cuprammonium viscosity approaching that of cotton linters. By controlling conditions the properties of the resulting alpha cellulose could be altered. A pilot plant is now in operation with a view towards possible large scale production. L. H. Ryerson and R. E. Montonna. Chem. Bull. (Chicago) 28, No. 9, 265; through Bull. Inst. Paper Chem. 12, 120 (1941).

Wheat Straw Holocellulose

Using a method similar to the isolation of wood holocellulose, the authors prepared and examined wheat straw holocellulose, the acetyl content of which is similar to that in certain softwoods. Raw straw treated in a rod mill, yielded 69 per cent holocellulose, a product developing its strength properties slowly during beating, and thus differing from wood holocellulose. This is possibly accounted for by the high silica content of straw holocellulose. W. A. Schenk and E. F. Kurth. Ind. Eng. Chem., 33, No. 11, 1398-1402 (1941).

Spruce Wood Hemicellulose

A study was made to determine the nature of "readily hydrolyzable" hemicelluloses of wood. When spruce was heated with a buffer solution of acetic acid-sodium acetate, *p*H4.05, for twenty-four hours at 130 C. it lost about eight per cent of its total weight. Extending the cook to thirty-six hours had no very appreciable effect. Of the hemicelluloses removed about 33 per cent were recovered as monosaccharides (soluble in 90 per cent alcohol) 56 per cent as polysaccharides insoluble in 85 per cent alcohol, and 11 per cent as a heterogeneous (probably low molecular) fraction soluble in 85 per cent alcohol, but insoluble in 90 per cent alcohol. In this fraction of monosaccharides, a hydrolysis gave 47.6 per cent glucose and 45.1 per cent xylose, with subordinate amounts of mannose and galactan. In the polysaccharide fractions precipitated with alcohol, however, mannose predominated, and in the precipitate obtained with 85 per cent ethanol, xylose amounted to only about 11 per cent. The residual wood (after the original cook) was then hydrolyzed further with a HCl-KCl solution (*p*H 2) at 130 C. for 8-10 hours and then hydrolyzed further with four per cent sulphuric acid. However, this last step made little change in the reducing sugar which amounted to about 8 per cent; over 56 per cent of these sugars was glucose, with mannose, xylose and galactan occurring in the order named. Erik Hägglund and Rutger Carson, Svensk Kem. Tid. 53, No. 7, 228-32 (1941).

Pure Cymene as a Sulphite By-Product

Reference is made to the recovery practiced in a Swedish mill at Skoghall, and could be applied to mills using hot acid systems. Relief gases taken from the hot acid tank (not directly from the digesters) are cooled, and the cymene and water condensed in a suitable trap. The sulphur dioxide is reutilized. Water and organic liquid are separated and the latter is washed with water and aqueous soda solution, and finally filtered through a layer of sodium sulphate and cotton cloth. The colorless hydrocarbon consists of 90 per cent cymene. The remainder is made up largely of terpenes. A. Waller. Svensk Papperstidn. 44, No. 19, 427-9 (1941); through Bull. Institute Paper Chem. 12, 103 (1941).

Writing on Paper with Ink

Other studies have paid attention to paper surface but have ignored or minimized factors such as the ink used, type of pen, and the writing habits of individual men and women. Some of these factors have now been studied. For example, the "writing pressures" exerted by penmen and penwomen, the amounts of ink deposited by various fountain pen nibs, etc., have been taken into account. The eventual objective is to effect economies in sizing, by studying the wear on the paper surface. The authors give details for empirical tests, and the results are presented in graphs. These include the relation between writing pressure and ink consumption, penstroke, and the distribution of writing pressures of 50 men and 50 women. It is evident that the "writing pressure" exerted by a single individual will vary at different times to the extent of ±20 per cent. In writing his own signature the individual usually exerts a greater pressure than in copying some neutral text. In these 100 experimental tests, the average writing pressure exerted by the nib on the sheet surface was 78 g. for men, and 56 g. for women. In only about 20 per cent did this pressure exceed 100 g. Few men and no women reached the pressure of 200 g. The amount of ink measured in mg/sq. cm. by a certain type of pen nib with a pen stroke of a definite unit width, appears to be a measure of the strain placed on the paper sheet. The harder, broader nibs deposit less ink ordinarily than do softer and narrower nibs for the same unit width. Thus they cause less wear and tear of the sheet. When pen strokes are not interrupted (and this was the case in this study) there is far less ink consumption than in ordinary correspondence. W. Brecht and E. Liebert. Papier-Fabr. 39, 169-75 (1941).

Analysis of Hardwoods

The heartwood and sapwood of six American hardwoods were analyzed by methods some of which are slight modifications of those used in the Forest Products Laboratory. This is a part of a project of the N. Y. State College of Forestry, and was made with wood samples the complete history of which was known. They represent data from triplicate determinations. The authors examined big tooth aspen, paper and yellow birch, beech, sugar maple, and fire cherry for ash, cold and hot water-, ether-, and alcohol-benzene-solubilities, pentosans, lignin, cellulose, cellulosans, holocellulose, per cent acetyl and methoxyl. The holocellulose fractions were also analyzed. In general the work of Ritter and his colleagues is confirmed. R. D. Freeman and F. C. Peterson. Ind. Eng. Chem., Anal Ed., 13, No. 11, 803-5 (1941).

Spinning Paper

These are two articles from Sweden. The paper is made from sulphate pulp and is used in making yarn. Specifications are:—a minimal breaking length of 11,000 meters (machine direction) and 3500 meters (cross direction) the ability to take up a minimum of 45 per cent water and to have a maximum water absorption of 55 per cent; a wet strength of approximately 15 per cent of the dry strength, and a 2 per cent stretch. Methods for sampling and conditioning are given. Twenty-four hours of conditioning at 65 per cent relative humidity are required. For breaking length, the moisture content reached must be by absorption not desorption. About 1-2 weeks after manufacture (particularly in non-calendered papers) breaking length values are subject to change, and these appear to depend on the drying that obtains in the papermachine. The second article deals with the manufacture of yarns, modifications in textile machinery required and advantages and disadvantages of the process, etc. Spinning paper is considered a substitute in the jute industry and some of its uses may survive the present crisis. S. Köhler. Svensk Papperstidn. 44, 335-9. G. Blum. Ibid. 356-61 (1941) through Bulletin Institute Paper Chem. 12, 113-4 (1941).

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Fig. 0852, 6" 250 lbs. steam pressure

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Fairbanks Sphero Valves

PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Wire Faced Roll for Papermaking Machines

Patent No. 2,240,869. Harry G. Specht, Montclair, N. J., assignor to Encor Corporation, Belleville, N. J., a corporation of New Jersey. Application April 17, 1939, Serial No. 268,166. 10 Claims. (Cl. 92—43). In a cylindrical roll for papermaking machines, a cylindrical supporting structure for a wire mesh covering comprising a plurality of longitudinally spaced coaxial circular head members, a plurality of circumferentially arranged supporting members extending between said head members and connected thereto, said supporting members having longitudinally spaced openings, there being a transverse supporting portion adjacent one edge of each of said openings, and a fin projecting outwardly from said supporting portion at an angle thereto, a reinforcing rib in said fin extending to the outer edge of said fin to provide a transversely widened supporting edge portion, the outer edges of said fins constituting a supporting surface for the wire mesh covering.

Sizing Composition

Patent No. 2,241,174. Calvin L. Bachelder, Kalamazoo, Mich., assignor to Hercules Powder Company, Wilmington, Del., a corporation of Delaware. Application February 3, 1940, Serial No. 317,130. 6 Claims. (Cl. 134—21). An aqueous paper coating composition comprising emulsified wax and rosin size in a weight ratio between about 3:1 and about 1:2 on a dry basis, an amount of protein representing between about 1/5 and 1/33 of the combined weight of wax and rosin size, an amount of water sufficient to provide a dispersion containing between about 0.5 and about 10 per cent by weight of the foregoing mixture of wax, rosin size, and protein, and starch in an amount representing between about 1 and about 6 per cent by weight of the entire composition.

Glossmeter

Patent No. 2,246,501. Donald B. Bradner and George C. Munro, Hamilton, Ohio, assignors to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. Application March 1, 1939, Serial No. 259,155. 8 Claims. (Cl. 88—14). A device for measuring gloss on paper comprising a cylindrically convex support for giving a definite form and position to the paper whose gloss is being measured, a light source, a lens for collimating light from said source into a beam of substantially parallel rays, a cylindrical light converging element disposed parallel to said support and in the path of said beam with its focal line approximately coincident with the virtual focal line of the cylinder formed by the paper on said support, whereby that part of the light beam which is specularly reflected by the paper on said support is in the form of a substantially parallel beam, and means for measuring the intensity of that part of the light from said beam which is specularly reflected by the paper.

Moistureproof Sheet

Patent No. 2,252,091. Philipp Müller, Wiesbaden-Sonnenberg, and Otto Herrmann, Wiesbaden, Germany, assignors to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware. Application August 13, 1938, Serial No. 224,819. In Germany August 23, 1937, 13 Claims. (Cl. 91—68). A wrapping tissue comprising a glycerinated water-sensitive, non-fibrous, cellulosic base, a moistureproofing surface coating and an intermediate coating, the said moistureproofing coating comprising a cellulose derivative film-former and a wax moistureproofing agent, the said intermediate coating comprising essentially the polymerization product obtained by polymerizing together a member of the group consisting of maleic acid, fumaric acid, itacomic acid, citraconic acid, phenyl maleic acid, benzyl maleic acid, dibenzyl maleic acid, ethyl maleic acid and their anhydrides with a member of the group consisting of vinyl esters, vinyl ethers, vinyl halides, acrylic acids, acrylic esters and cinnamic acid esters.

Paper Filler

Patent No. 2,237,374. Allan K. Smith, Appleton, Wis., assignor to The Institute of Paper Chemistry, Appleton, Wis., a corporation of Wisconsin. Application July 11, 1936, Serial No. 90,255. 10 Claims. (Cl. 134—38). A method of making a filler for use in the paper industry which comprises mixing an aqueous solution of an alkali silicate with an aqueous solution of a soluble metal salt, the metal of said salt being selected from the group of metals forming white oxides in the presence of dilute alkaline solutions, neutralizing the mixture with an acidic material, washing the precipitate thus formed to remove soluble salts and drying said precipitate.

Pulp Screening Apparatus

Patent No. 2,246,669. Elijah Cowan, Dolbeau, Quebec, Canada. Application June 13, 1938, Serial No. 213,459. 4 Claims. (Cl. 92—34). Pulp screening apparatus of the "quiller" type comprising a stationary cylindical screen through which the pulp suspension is passed, an impeller comprising a plurality of impeller blades fixed to a hub mounted on a rotary impeller shaft extending axially through said screen, said shaft being provided with an internal water passage having radial outlet openings communicating with radial openings formed in said hub and each of said impeller blades being provided with radial grooves formed in the pressure side thereof and having their inner ends communicating with certain of the hub openings and means for supplying dilution water to said passage for delivery to said grooves.

Felt Cleaner

Patent No. 2,245,109. Lawrence L. Lapeyrouse, Chickasaw, Ala. Application March 1, 1938, Serial No. 193,373. 1 Claim. (Cl. 92—30). A cleaner for the felt blanket of a paper making machine, comprising a vacuum head open upon one face over which the felt passes, a series of rollers mounted in the head and extending across the open face thereof, said rollers being alternately of longitudinally concave and convex form, each of said rollers having openings through its periphery into which water from the felt is drawn by the vacuum, the rollers having longitudinally extending through chambers into which the openings extend, the chambers discharging into the vacuum head, the side walls of the vacuum head at the top edges thereof being disposed in close proximity to the ends of the rollers and the rollers being of the same diameter at their ends and flush with the tops of the adjacent side walls to prevent the felt from being drawn down between the ends of the rollers and the side walls of the head.

Paper Product

Patent No. 2,251,296. Joseph H. Shipp, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware. Application June 1, 1938, Serial No. 211,297. 17 Claims. (Cl. 91—68). In the manufacture of grease-proof paper the step of applying to the surface of a paper having a porosity not exceeding book paper, a solution of polyvinyl alcohol having an intrinsic viscosity, based on a 4% solution in water at 25° C., of from 10 to 100 centipoises.

Slice Construction for Papermaking Machines

Patent No. 2,264,941. William R. Kellett, Menasha, and Huron C. Brien, Neenah, Wis., assignors to Paper Patents Company, Neenah, Wis., a corporation of Wisconsin. Application March 10, 1939, Serial No. 260,956. 5 Claims. (Cl. 92—44). In a hydraulic inlet for Fourdrinier paper making machines, the combination with an inlet structure, of a slice carrier pivotally mounted on the forward end of said structure and disposed forwardly of the top tangent point of the wire on the breast roll of the machine, a substantially vertical thin flexible steel slice mounted on and projecting below the lower edge of said slice carrier, a strip mounted on and lengthwise of the front side of the upper portion of said slice, and a plurality of independently operable laterally spaced devices for locally flexing the projecting portion of said slice in the machine direc-

tion, each of said devices comprising upper and lower bearing brackets secured respectively to said strip and the downwardly projecting portion of the slice, a pin mounted in said lower bracket, an upright lever fulcrumed between its ends on said upper bracket and having a slotted lower end straddling said pin, and a micrometer adjusting means connected to the upper end of said lever.

Method of Coating Paper and Product Thereof

Patent No. 2,263,575. William M. Glenn, Aurora, Ill., assignor to Glenn Davidson. Application August 25, 1938. Serial No. 226,705. 11 Claims. (Cl. 91—68). In a process of coating paper, applying to the paper an alkaline agent and starch, and subsequently applying thereon an aqueous oilseed flour and mineral suspension.

Papermaking Machinery

Patent No. 2,243,773. Herbert Charles Randell, Bury, England, assignor to Walmsleys (Bury) Limited, Bury, England, a British company. Application January 19, 1939, Serial No. 251,827. In Great Britain January 21, 1938. 3 Claims. (Cl. 92—43). A papermaking machine comprising a substantially semi-cylindrical vat, a cylindrical mould rotatable in said vat, an inlet compartment through which stock is fed to said mould, a dam at the upper and outlet end of said inlet compartment and over which the stock is projected into said vat and into contact with said mould, a flexible plate extending over the entire length of the vat above said dam and angularly adjustably displaceable to vary its height above the top of said dam so as to vary the opening for the projection of said stock into said vat, and means for varying the height of said flexible plate differentially along its length whereby to vary the depth of said opening at different positions longitudinally of said plate and said vat.

Method of Laminating Paper

Patent No. 2,256,916. Van Hamm Wilshire, Dayton, Ohio, assignor to The Specialty Papers Company, Dayton, Ohio, a corporation of Ohio. Application July 12, 1938, Serial No. 218,779. 2 Claims. (Cl. 154—40). The method of making a laminated sheet of waxed paper adapted for contact with edibles comprising applying a hot coating of wax on both sides of a thin sheet of substantially greaseproof paper, concomitantly applying a hot coating of wax to both sides of a thicker sheet of wax absorbent paper, the application of the wax coatings to the sheets being accomplished by passing both sheets into the same body of heated wax, moving the coated wax absorbent sheet around heated rolls providing a prolonged heating effect first on one side of the sheet and then on the other for absorption of surface wax into the body of such sheet, and pressing the combined sheets between coacting pressure rolls while the wax is hot to unite the two sheets together.

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New Catalogues, Ass'n Reports, and Publications

Annular Bearing Engineers' Committee, 60 E. 42nd St., New York City—A grease and oil guide for use in connection with lubrication of ball bearings has been adopted by this committee. Detailed and technical data on different greases and oils, together with an explanation of the method of testing greases, and an informative chart giving a cross-classification analysis of what grease to use as governed by the speed factor and temperature, are included. Another section deals with lubrication of antifriction bearings with oil, this section is supplemented by another chart. This guide is available on request.

American Engineering Co., Philadelphia—A complete description of the operations, advantages, and applications of the Water-Cooled Taylor Stoker is contained in a recent publication. The features of this stoker are labeled in a large illustration and described in detail. Various views of the machine are illustrated with diagrams and the principle of operation is described. A representative list of installations is also included.

Babcock & Wilcox Co., New York City—Classes 9, 12, and 15 of the Integral-Furnace Boiler are explained and described in this company's latest publication (Bulletin G-34 A). The construction, design, and principle of operation of this boiler are clearly described and pointed out by the same diagrams. Charts giving the dimensions are also included.

Blackmer Pump Co., Grand Rapids, Mich.—This company has just published a booklet answering everyday questions concerning pumps, piping applications, viscosity of liquids, pipe friction, etc. Comprehensive tables of friction losses in pipes, covering viscosities to 2400 S.S.U., valves and fittings, viscosity conversion tables, tables of practical suction files, etc., are given. This bulletin brings together in very accessible form a number of tables and liquid classifications.

Black-Clawson Co., Hamilton, Ohio—A new service has been started involving the publication and distribution of non-cost dimension sheets designed to speed up the making of mill layouts. These sheets are accurately drawn to three different scales—¼", ⅛", and 1/16" and printed on transparent paper. Each sheet is a complete dimensional print of some unit of paper mill machinery, such as a jordan, a valve, or a drive. These sheets also include information necessary to check old layouts, photographing for extra prints, and comparisons with other machinery. This service is offered to paper mills without charge and a permanent loose-leaf binder is furnished with the sheets already prepared.

Cambridge Instrument Co., New York City—A folder has just been issued describing industrial models of analyzers, indicators and recorders. Recording gas analyzers together with pH and other equipment for making precise measurements that effect saving of time, material and labor in production, are featured. Inquiries concerning instrument problems are invited.

The Cleveland Crane & Engineering Co., Wickliffe, Ohio—A very well-planned publication dealing with engineering and application data has just been issued by this company. This two-color, 12-page booklet uses many illustrations showing various materials handling equipment in use. Line diagrams illustrating the equipment in operation are used on the front and back cover.

Cochrane Corp., Philadelphia—The new Cochrane-Becker high-pressure condensate return system is described in a new four-page bulletin. Fifty different industries including the paper industry are listed in which appreciable increases in production rates and high fuel savings are being made where the equipment depends on uniformly high steam temperatures for efficient operation. A typical installation is described in detail with a four-color illustration.

Gast Manufacturing Co., Benton Harbor, Mich.—Vacuum pumps and compressors are described in detail in this company's new publication entitled "Gast Rotaries." Six illustrations of typical applications of Gast air pumps and compressors are shown. A cut-away illustration shows the construction features of Gast Rotary design. Also included are an explanation of the principle of operation, and dimension and performance tables of Gast integral models. A chart is included showing the efficiency and economy of Gast rotary pumps and a price list of both pumps and compressors.

General Electric Co., Schenectady, N. Y.—This company's new, 8-page booklet gives a complete story of Thy-mo-trol, the new G-E electronic control system for the operation of direct-current motors from alternating-current lines. The booklet contains illustrations, a simplified chart, and diagrams and explains the functions and advantages of the Thy-mo-trol system. The single-dial speed control is discussed, and four typical applications of the instrument are included.

A. P. Green Fire Brick Co., Mexico, Mo.—A new folder on refractory maintenance coating telling users how they can get a longer life and greater service from refractory linings is now being distributed. The lining which this booklet discusses is called Greencote. Illustrations are used to show the difference between those surfaces on which Greencote was used and those on which it was not used.

Leeds & Northrup Co., Philadelphia—Combustion efficiency can be held at a high level in any steam plant with the use of Micromax CO_2 recording equipment for flue-gas analysis, according to this company's latest catalogue. This equipment is explained and discussed. The machine is illustrated and the principle of operation is diagrammatically explained. The mounting dimensions of the recorders are also included and large illustrations of the Model R and the face of Model S is included.

Magnus Chemical Co., Inc., Garwood, N. J.—"The Care and Cleaning of Hands and Arms in Industrial Plants" is the title of a new booklet designed to help those interested in industrial dermatoses. Some of the subjects discussed in the booklet are; what a hand cleaner should do and what it should not do, safe detergents and scouring agents, germicides and medicants, lime scums and rinsing, cleaning routines, protection of hands and arms on the job. The importance of cleanliness in the maintenance of industrial health is stressed.

Oakite Products, Inc., New York City—"Cleaning of Metals Before Electro-Plating" is the title of a new 32-page manual describing modern materials and methods designed for cleaning a wide range of metal and alloys before electroplating or other finishing operations. It is suggested that this booklet might be used by pulp and paper men as a guide on the most recent developments in cleaning metal stampings, castings, and parts between machining operations, or before inspection, assembly or electroplating.

Joseph T. Ryerson & Son, Inc., Chicago—The 1942-43 catalogue of Ryerson steels has just been issued. The first section of the booklet contains a review of the developments of this company which was established in 1842. The other 268 pages deal with the products manufactured by this company and the information is very well presented. A thumb or tab index is used to make it easy to turn to a certain section, a more complete index is also included. Many charts, diagrams and illustrations are used.

Staynew Filter Corp., Rochester, N. Y.—The Ventilating Filter Division of this company has just prepared a 40-page catalogue displaying and explaining its ventilating equipment. The first section of this booklet deals with automatic air filtration and the equipment used. Another section is concerned with protectomotor filters for pipe lines. A detailed specification chart of circular type or radial-finned filter inserts is included. Many other illustrations and charts are used to explain the variety of other equipment.

Technicraft Engineering Co., Division of Lane-Wells Co., Los Angeles—Sterozone, a newly perfected machine for water purification, according to this company, is discussed at length in a recent bulletin. The many features of this machine are thoroughly discussed together with an explanation of each. Charts and illustrations are used showing the efficiency of the new machine. One section of the booklet is devoted to specifications. On the back cover of the bulletin an analysis of sterozone treated water is featured.

Western Precipitation Corp., Los Angeles, Cal.—Fly Ash elimination is the subject discussed in this company's latest publication. The 9VF Multiclone machine which separates Fly Ash from boiler flue gas is described and explained in detail in this booklet. Many illustrations are included showing the machine and the principle of operation. The variations of total collection efficiency is explained with charts. Dimension sheets are also included.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.—Electric heating units and controls for industrial application involving the heating of liquids, solids, or air are described in the revised edition of this company's catalogue. Specifications, diagrams, descriptions, ratings, and prices of eight types of heaters are included. Typical heating problems are discussed and solved together with seven pages on application data and proper selection information.

Worthington Pump and Machinery Corp., Harrison, N. J.—The Moore Steam Turbine Division of this corporation has just issued two bulletins. The first (Bulletin 1955) deals with multi stage steam turbines. A large illustration shows many of the working parts of the type S turbine and diagrams and charts are also used to explain the machine. The second booklet is concerned with steam turbines with combined reduction gears types GA and GB. This booklet is the same as the first one, a large illustration, diagrams, and charts.

Books

Eye Hazards in Industry—A book of 321 pages, published for the National Society for the Prevention of Blindness by Columbia University Press, Morningside Heights, New York, this volume is the work of Louis Resnick. The chapters of the book are divided conveniently into two parts: namely, The Problem, and The Solution, the first treating of eye hazards, eye accidents, eye diseases, defective vision, first aid; the latter, of mechanical guards, process revision, proper lighting, education, and administrative supervision. In addition, there are four appendices, (1) a self-appraisal for eye safety in industry, (2) industrial poisons which are hazardous to the eyes, (3) recommended minimum standards of illumination for industrial interiors, and (4) a listing of some national organizations concerned with

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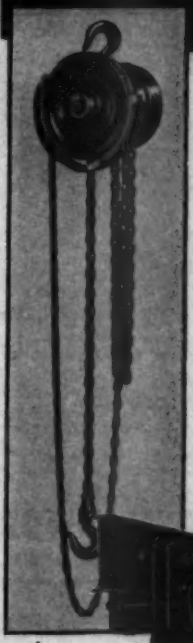

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But you get more than the hoist fitted exactly to your needs. *First*—you get the Wright engineering experience which assures you the most economical solution of your problem with the WRIGHT HOIST. *Second*—you get inbuilt safety in every part. The load chain, for instance, has a safety factor of 7 to 1. The bottom hook slowly opens to indicate overload.

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There's nothing complicated about Skid-Em-Ons. . . no fancy gadgets or complex mechanism. A roll is rolled onto the truck, nestled gently into a specially-designed cradle and rolled off easily and without effort. Economy, that's the best thing about Skid-Em-Ons. *One man* can handle all operations connected with this truck . . . loading, carting and unloading! Interested? Just drop us a line . . . we'll be glad to supply you with full information.

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industrial welfare, and an extensive bibliography. Bound in a durable red cloth cover with cover printing in black and gold, the book is priced at $3.50 a copy.

Thermochemical Calculations — Ralph R. Wenner, the author of this recently published volume, states in his preface that the book is not intended to be a comprehensive presentation of the principles of thermodynamics, nor a textbook of industrial chemistry or chemical engineering, but rather a demonstration of methods for applying thermodynamic principles to a wide variety of practical laboratory and technological problems. This book is divided into two major parts—the first, consisting of eight chapters, is devoted to principles; the second, devoted to applications, includes nine chapters. It is a volume of nearly 400 pages, durably bound in green cloth cover. The publisher is the McGraw-Hill Book Company, Inc., 330 West 42nd St., New York, N. Y.; the price, $4.00 a copy.

Industrial-Commercial Electrical Reference—This book by E. S. Lincoln, Consulting Engineer, is a comprehensive treatise of facts, tables and general information for all branches of the electrical industry. With a page size of 8½ in. by 11 in., the book totals 1310 pages. Its presentation includes 1200 illustrations, 326 diagrams, and 315 tables. Divided into 26 sections, the volume covers the field of industrial electric operations from service entrance through utilization equipment. Each section devoted to service or utilization equipment includes data on installation and operation. Among the sections of the book of most direct interest to engineers and production executives of the pulp and paper industry concerned with the subject of electrical power are: Industrial Wiring Systems; Switchboards; Panelboards; Electrical Control; Electrical Circuit Protection; Motors and Generators; Power Factor and Its Correction; Industrial Lighting; Industrial Heating Equipment; Electrical Furnaces; Electric Welding; Industrial Signal Systems; Transformers; Storage Batteries; Electronic Equipment; Electrical Measuring Instruments; Electrical Measurements; Electrical Surveys; Miscellaneous Electrical Equipment and Applications; Inspection and Maintenance of Electrical Equipment; and Protection Against Personal Injury. Bound most attractively and durably in a blue cloth cover with backbone and front cover printing in aluminum, the book is priced at $15.00 a copy by the publisher, The Electrical Modernization Bureau, 60 E. 42nd St., New York, N. Y.

The Paper Makers' Directory of All Nations (1941 edition)—The first edition of this book dates back to 1889, and, except for a brief interval during its early days, the directory has been issued annually since that time. It not only lists the names and addresses of the pulp, paper and paperboard mills of the world by countries but includes much other useful information as well. Preceding the listing of the various mills, there is material concerning paper trade customs of Great Britain, British paper trade associations, foreign paper trade associations and British export merchant shippers of paper. The mills of Great Britain are handled separately from those of foreign countries, the British dominions and colonies; but an alphabetical listing of the mills by firm names is followed throughout the volume. A number of new addresses and emergency locations are included in the part dealing with Great Britain. The book is concluded with a classified index of sources of supply of different kinds of pulp, paper and paperboard by countries of origin. Dean and Son, Ltd., 41-43, Ludgate Hill, E.C. 4, London, England, the publisher, has priced the book at 25/- net per copy.

Association Reports

All of the orders which affect the industry emanate from the WPB and the OPA and clear through the office of E. W. Tinker, executive secretary of the American Paper and Pulp Association. Copies of all government orders are sent by the Association to members. Listed below are releases sent out during January by the APPA. Any correspondence with that office regarding these releases should carry identifying numbers under "National Defense."

No. 55—Distributor's Classification of Sales. A questionnaire form is contained in this release to determine the total amount of National Defense business produced in certain trading areas in relation to (a) industrial sales, and (b) sales to retailers.

No. 56—Priorities Regulation No. 1. This order is an amendment of Priorities Regulation No. 1 and involves several important changes. This regulation is issued to promote the defense of the U. S. and facilitate the operation of the Priorities System. This order is the basis of all priority regulation.

No. 57—Rubber Tire Rationing Order M-15-c. This order states that each county will have a Local Tire Rationing Board that will pass on all tire purchases. A list of vehicles which may be equipped with new rubber tires, casings, or tubes is included.

No. 58—New Mandatory Restriction on Inventory. This order states that all users of pulp as well as other materials used in the manufacture of paper should be careful not to accept from a manufacturer or deliver to any customer materials in excess of the practicable working minimum.

No. 59—Amended Price Schedules Nos. 28, 36, and 37. This order gives the latest prices of Ethyl alcohol (No. 28), Acetone (No. 36), and Butyl alcohol (No. 37). These schedules take the place of those in Order No. 35.

No. 60—Wood Pulp Allocation. This order requires every sulphite pulp producer in the country to contribute part of his production to compensate for the loss of paper grades of wood pulp due to the requirements of the Government for nitration pulp.

No. 61—Titanium Order M-44 Amended. This new order amends Order M-44 in three ways. The first change makes it necessary to place orders a month earlier, the second change prevents seasonal users from getting more than previously, and the third change applies to the producer.

No. 62—Salvage of Scrap Materials. This order suggests a plan for plants to put into operation to salvage all scrap materials needed in the war effort.

No. 65—Wood Pulp Allocation. This order states that Rayonier, Inc., will receive the entire January allotment of wood pulp which must be distributed among its customers under the terms set forth in the original order. (Order M-52.)

No. 66—Scrap Fourdrinier Wire. This order states that scrap wire and screens should be returned to industry through the regular channels of trade as fast as possible, in accordance with Copper Order M-9-b.

No. 67—Price Prevailing at Date of Shipment. This order prevents the use of the quotation "price prevailing at date of shipment" because the act to freeze paper prices makes this phrase unnecessary.

Traffic No. 1 (Petition of Railroads for Uniform Freight Rate Increase). To a request by the railroads to increase their blanket freight rates by 10 per cent except on coal and iron ore, the traffic committee answered that any increase should not exceed the increase in cost of operation, and that the increase should be distributed evenly over all commerce.

Traffic No. 2. This release gives the argument presented by the counsel retained by the American Paper and Pulp Association to give the industry's side of the case.

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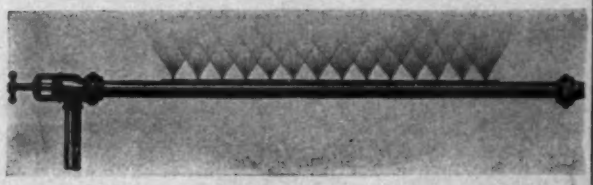

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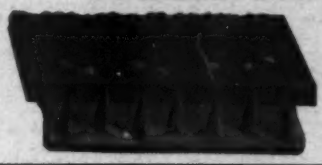

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WANTED—Paper converting equipment. Need immediately; coating, combining, creping, impregnating, calendering, embossing equipment for web about 60" wide. Address Box 312, Fritz Publications, Inc.

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RAGS (Domestic)
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NEW RAGS

	per cwt.
Blue Overalls	5.75 to 6.00
Corduroy	2.75 to 3.00
Cottons—	
Washables, No. 1	2.75 to 3.00
Fancy Percales	4.15 to 4.25
New Soft Blacks	3.75 to 4.00
New Light Seconds	2.50 to 2.75
New Dark Seconds	2.25 to 2.50
Khaki Cuttings—	
Mixed	3.25 to 3.50
O. D.	4.00 to 4.25
New White Canvas	3.00 to 3.50
New Mixed Blacks	2.75 to 3.00
Shirt Cuttings	
New White No. 1	8.00 to 8.25
Silesias No. 1	5.00 to 5.25
New Unbleached	8.25 to 8.50
Fancy	3.25 to 3.50
Linen Cuttings—	
White	12.00 to 13.50
Grey	12.50 to 13.00

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f.o.b. cars at points of shipment, with brokers' allowances of $1 to $2 a ton depending on the value of the grade involved.

	per ton
Roofing—	
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)
ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shappories	

ROPE and BAGGING
f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	4.00 to 4.25
Wool Tare—	
Light	4.00 to 4.25
Heavy	4.25 to 4.50
No. 1 Scrap Bagging	3.75 to 4.00
Manila Rope—	
Foreign	7.00 to 7.25
Domestic	7.00 to 7.25
New Burlap Cuttings	5.00 to 5.25
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	8.50 to 9.00
Strings—	
Sisal	3.50 to 3.75
Soft jute	4.50 to 4.75
Mixed	1.25 to 1.50

WASTE PAPER

OPA ceiling prices in sales to consuming mills f.o.b. points of shipment East of Rocky Mountains; additional $1 a ton loaded on freight cars and brokers' commissions of 4 to 9 per cent allowed.

	per ton
Shavings—	
White Env. Cuts, One-Cut	67.50-
Hard White Env. Cuts	62.50-
Hard White, Unruled	57.50-
Hard White, Ruled	50.00-
Soft White, One-Cut	57.50-
Soft White, Misc.	43.00-
Fly Leaf, No. 1	32.50-
Fly Leaf, No. 2	22.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Mixed Colored	15.00-
Flat Stock—	
Overissue Magazines	32.50-
No. 1 Heavy Magazines	31.50-
Mixed Books	20.50-
Ledger Stock—	
No. 1 White	42.50-
No. 1 Mixed (Colored)	37.50-
Manilas—	
New Env. Cuttings	53 00-
New Env. Cuts, One-Cut	57.50-
Extra Manilas	37.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Colored Manila Tab Cards, Free of Ground Wood	30 00-
Ground Wood Manila Tab Cards	27.00-
Ground Wood Manila Tab Cards, Colored	30.00-
Kraft—	
Envelope Cuttings	65.00-
Mixed Env. or Bag Cuts	55.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	35.00-
News—	
White Blank	33.00-
Overissue	17.00-
No. 1 Baled	15.00-
Old Corrugated Boxes	16.50-
New Corrugated Cuts	18.00-
Box Board Chips	14.50-
Dry Goods Waste	14.00-
No. 1 Mixed Paper	14.00-

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	35.00 to 42.00
Dry, barrels, pound	.0300 to .0400
Bleaching Powder—	
Drums, cwt.	2.00 to 3.00
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	30.00 to 31.00
80-100 mesh (bags), lb.	31.00 to 32.00
Argentine, lb.	29 00 to 30.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	7.50 to 15.00
Domestic Coating	
Bulk (mine) ton	12.00 to 22.00
Imported (ship side)	
Bulk (lump) ton	15.00 to 26.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (edible), lb.	.90 to .95
Glue. (C.P.) drums, lb.	18.50 to 19.75
Litharge, powd., bbl., lb.	.09 to -
Resin (Gum)—	
New York, per 100 lbs.	
E	3.87-
F	3.95-
G	3.50-
WW	4.00-
Rosin (Wood), carlots	3.12-
Salt Cake—	
Dom. bulk (wks) ton	16.00 to 17.00
Imp. bulks on dock—	
(Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.70 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.85 to 2.00
40 deg., 55 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.10-
Pearl, barrels, cwt.	3.20-
Paper (Sp.) bags, cwt.	3.20-
barrels, cwt.	3.30-
Sulphur (crude)—	
(mine) bulk, long ton	18.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	15.00 to 20.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.06 to .06¾
Zinc Sulphide, bbls., lb.	.06¾ to .06½

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached, contract	3.30 -
Open market	(nominal)
Sulphate (Dom.) f. o. b. mill—	
Bleached	4.25 to 4.50
Kraft No. 1	3.50 to 3.75
Kraft, Southern, del.	3.25 to 3.50
Sulphate (Imp.) on dock—	
Bleached	(nominal)
Kraft No. 1	(nominal)
Kraft No. 2	(nominal)
Sulphite (Fur.) On dock—	
Prime bleached	(nominal)
Prime easy bleach	(nominal)
Prime strong unbl.	(nominal)
Sulphite (Dom.)	
Bleached, contract	3.62½ -
Bleached, open market	(nominal)
Unbleached, contract	3.17½ -
Unbleached, open market	(nominal)

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. pulp mill)	31.00 to 34.00
No. 1 Imp. (On dock)—	
Moist	—
Dry	—

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	80.00-
Chip	45.00-
Chip, egl. mln. lined	60.00-
Coated, white patent .010	80.00-
.020 and heavier	75.00-
Kraft liner	60.00-
News	45.00-

	per cwt.
Book (coated)	
No. 1 Coated	15.50-
No. 2 Coated	14.00-
No. 3 Coated	13.25-
No. 4 Coated	12.75-
No. 2 Offset	11.75-
A Grade Super	10.75-
B Grade Super	10.25-

	per cwt.
Bonds (Rag Content)—	
100% Rag	
Ext. No. 1	43.75 to 47.25
100% Rag	33.00 to 37.75
85% Rag	
75% Rag	26.90 to 29.00
65% Rag	
50% Rag	21.45 to 23.50
25% Rag	18.90 to 20.00
Regular Colors	1.00 cwt. extra

	per cwt.
Bonds (Sulphite)—	
No. 1	11.70-
No. 2	10.75-
No. 4	9.90-
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	14.00 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50
Ledgers (Rag Content)—	
100% Rag	
Ext. No. 1	41.40 to 48.50
100% Rag	36.25 to 39.25
85% Rag	32.20 to 37.75
75% Rag	28.15 to 30.50
65% Rag	22.80 to 27.75
50% Rag	23.10 to 24.25
25% Rag	19.50 to 21.50
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	12.00-
No. 2	12.05-
No. 4	11.20-
News—	
Rolls (Contract)	50.00-
Rolls (Spot)	(nominal)
Sheets	58.00 -

	per ream
Tissues (Carlots)—	
White, No. 1	1 12½
White, No. 2	.95-
Bleached Anti-Tarnish	1.30-
Colored	—
Anti-Tarnish Kraft	1.10-
Manila	.90 to .95
Napkins, semi-crepe (12¾ lb. to M shts.) per cs.	.80 -
Napkins, full crepe and emb'sed (12¾ lb. to M shts.) per cs.	.80 -
Toilet, Bleached (M shts.) per cs.	5.65 -
Toilet, Unbleached (M shts.) per cs.	4.25 -

	per case
Towels—	
Bleached	3.20 to 3.75
Unbleached	2.60 to 3.05

	per cwt.
Wrappings (Kraft)—	
Extra Quality	6.00 to 7.00
Super-Standard	5.25 to 6.25
Northern Standard	4.75 to 5.25
Southern Standard	4.75 to -
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F.& M.G. Waxing, 20 lb. (Carloads only)	7.25 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.25 to 5.50
No. 1 Butchers	5.50 to 5.75
No. 1 Imit. Parch & Dry Fin.Groe.Sulphite 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin.Groe.Sulphite 30 lb.	6.00 to 6.25
Steam Finish, 50 lb.	4.75 to 5.00
Water Finish, 40 lb.	5.25 to 5.50
Manilas—	
Envp. Mls., Sub. 16-40 (No. 1)	6.00 to 6.25
Envp. Mls., Sub. 16-28 (No. 2)	5.75 to 6.00
Envp. Mls. (Prices based on large sheets untrim'd reammarked, in bdls.)	
Wrapp. Mls. 35 lb. up—	
No. 1	6.00 to 6.25
No. 2	5.75 to 6.00
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-25 lb.	7.20 to 7.40
Grade B-25 lb.	7.25 to 7.50